**U.S. Army Research Institute
for the Behavioral and Social Sciences**

Research Report 1929

**Web-enabled Exercise Generation Tool for Battle
Command Training**

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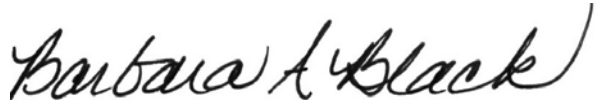
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**U.S. Army Research Institute
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14. ABSTRACT (Maximum 200 words): U.S. Army trainers are required to deliver effective training in less time than ever before. Therefore, research and development to support Soldier training must explore advanced learning environments, instructional strategies, and training-development processes to enable the rapid generation of training activities that are responsive to immediate training needs. The purpose of the present Phase II Small Business Technology Transfer (STTR) effort was to research and develop an integrated platform of technologies, the U.S. Army Training Assistant (TA), to enable "one stop" creation, delivery, and management of web-enabled multimedia training exercises. The Phase II work detailed in this report consisted of behavioral research, development of a working TA prototype, and usability testing of the prototype. Results indicated that test participants generally found the TA to be easy to use, with the majority reporting that they could and would use it. If developed, the Phase III product would address four main areas of enhancement identified during user testing to create a tool that will allow unit trainers to create accurate, engaging training.

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WEB-ENABLED EXERCISE GENERATION TOOL FOR BATTLE COMMAND TRAINING

EXECUTIVE SUMMARY

Research Requirement:

The rate of change in the modern operational environment requires U.S. Army trainers to deliver effective training in less time than ever before. Among the changing environmental conditions are enemy tactics, new vehicles and equipment, updated command, control, and communications systems, unit composition, and even unit structure. Each of these changes produces new requirements for structured training such that knowledge acquired from the operational environment can be transformed into skilled behavior. For Soldiers, most learning occurs on the job and is specific to the unit in which the Soldier is operating, so trainers keeping pace with environmental change must be able to quickly develop tailored training in order to foster human capital in their unit.

Research and development to support Soldier training must explore not only advanced learning environments and instructional strategies but also advanced *training development processes*. Advanced training development processes may enable the rapid generation of training activities that are responsive to immediate training needs. This final report documents a Phase II Small Business Technology Transfer (STTR) project to research and develop an integrated platform of technologies (the Training Assistant [TA]) to enable "one-stop" creation, delivery, and management of Web-enabled multimedia training exercises. The report begins by summarizing the Phase I research and development, then describes the Phase II work in detail. The report closes with conclusions and recommendations for future research based on initial testing and evaluation of the Phase II product.

Procedure:

The Phase I research analyzed the Army training process, identified methods for relieving the constraints on rapid, contextualized training development, and developed these methods into a prototype TA capability for feasibility analysis. The Phase II work detailed in this report consisted of behavioral research to examine the target user characteristics and the likely-use environment to ensure that the TA would optimally support the flexible development of decision-making exercises (DMX). In addition, the work focused on development a tool to develop new training in a way that is easy to use and integrated into a larger instructional context that individualizes training. Phase II also involved the development of a working TA prototype and usability testing of the TA prototype.

Findings:

We found that trainers would use the TA to rapidly develop foundational interactive multimedia exercises for individuals and/or small groups. The research further found that trainers may approach the creation of exercises with a particular doctrinal task they wish to train (e.g., report tactical information) and may approach training with a general competency they wish to develop (e.g., communications skills). Additionally, the results indicated that trainers are familiar

with mainstream software applications (especially Microsoft® Word and PowerPoint), Internet browsers (especially Microsoft® Internet Explorer), search engines (especially Google), knowledge management portals (especially Wikipedia, Questia, and Army-specific portals), and computer-based instruction, and that few trainers have formal education in instructional design. Finally, the results indicated that the design of the TA must resonate with trainers' understanding of doctrine but be flexible enough to address necessary deviations from doctrinal practices, such as "train-as-you-fight."

With regard to familiarity with computers, software applications, and other technology, trainees have similar characteristics as trainers. Trainees would use the TA to access and conduct training developed by their unit trainers or instructors. Trainees also may access the TA to conduct self-development using training residing in the TA archives. The training created in the TA must be easy for trainees to search, locate, and access. The exercises must be engaging, and performance feedback must be immediate and perceived as fair.

To meet the needs of both trainers and trainees, the TA was designed to serve as a training delivery tool, an authoring tool, and a learning management system (LMS). The functions of the tool are determined by a user's level of access (e.g., student, trainer, administrator). Structured training templates, generic base content, and an integrated search were the three main features incorporated into the tool to increase the speed with which trainers can create quality training.

User testing of the TA took place at Fort Hood and Fort Carson, and included 29 Soldiers. Results indicated that test participants generally found the TA to be easy to use (46-86%, depending on the feature assessed) with the majority reporting that they could and would use it (75% and 66% respectively). Usability enhancements were identified, and consistent with the purpose of alpha testing, users also identified a number of technical issues with the TA that represented the normal glitches in the development process of complex technologies.

Utilization and Dissemination of Findings:

Overall, the user testing revealed four main findings that should be addressed in future development cycles. First, the quality of generic content will be critical to the adoption of the tool. Second, training content that incorporates the latest information will be the most relevant to the operational environment, and that information is usually classified. Third, access to computers is limited. Fourth, modifications are needed to course and activity templates to enhance their flexibility and usability. Work continues to address the four issues to create a tool that will allow operational unit trainers to easily access the necessary resources to create engaging training that accurately reflects the realities of the current operational environment. The results of this research have been communicated to the U.S. Army Training Support Center, the Combined Arms Center – Training, and to representatives of the U.S. Army Training Network.

WEB-ENABLED EXERCISE GENERATION TOOL FOR BATTLE COMMAND TRAINING

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WEB-ENABLED EXERCISE GENERATION TOOL FOR BATTLE COMMAND TRAINING

Introduction

The rate of change in the modern operational environment requires U.S. Army trainers to deliver effective training in less time than ever before. Among the changing environmental conditions are enemy tactics (e.g., new methods for triggering improvised explosive devices), new vehicles and equipment (e.g., unattended ground sensors), updated command, control, and communications systems (e.g., Joint Network Node version updates), unit composition (i.e., personnel turnover), and even unit structure (e.g., ad hoc or interagency transition teams). Each of these changes produces new requirements for structured training, such that knowledge acquired from the operational environment can be transformed into skilled, automatized behavior (Shadrick, Lussier, & Fultz, 2007). Growth in training requirements outpaces formal educational milestones, which provide structured education but which also occur only a handful of times in a Soldier's career. For Soldiers, most learning occurs on the job and is specific to the unit in which the Soldier is operating, so trainers keeping pace with environmental change must be able to quickly develop tailored training in order to foster human capital in their unit.

There are, however, individual differences in trainers' abilities to design and produce effective training. First, trainers themselves are often unfamiliar with the content to be trained. This situation is common as Soldiers take on tasks that traditionally have fallen outside of their functional area (Gerber, 2007) or tasks that are new to the Army altogether (e.g., U.S. Army Center for Lessons Learned, 2007). Second, many trainers are unfamiliar with the principles of effective instructional design, having not had formal training in this area. Indeed, the doctrine-endorsed instructional strategy to "train-as-you-fight" (e.g., U.S. Department of the Army, 2003a), adopted by most trainers, contrasts with best practice in skill development as identified by scientific research. That research has shown that experiential learning is not sufficient for optimizing skill development, but that deliberate practice (i.e., structured, coached exercise on specific, challenging learning objectives with performance assessment and feedback; Ericsson, Krampe, & Tesch-Röemer, 1993) is required (Shadrick et al., 2007).

There are other challenges facing trainers who take the initiative to create adaptive training. Chiefly, trainers often are unaware of the resources available to build training content (or how to quickly find them) because these resources are widely distributed. These resources include the Center for Army Lessons Learned (CALL), Battle Command Knowledge System (BCKS) professional forums, Army Knowledge Online (AKO), the Reimer Digital Library (RDL), the Combined Arms Research Library (CARL), and unit networks, to name a few. Limited time prevents an in-depth search of this information. The same time constraints limit trainers' ability to modify the information they find such that it is usable for training purposes.

Therefore, research and development to support Soldier training must explore not only advanced learning environments and instructional strategies but also advanced *training development processes*. Advanced training development processes would enable the rapid generation of training activities that are responsive to immediate training needs. This final report documents a Phase II Small Business Technology Transfer (STTR) project to research and develop an integrated platform of technologies (the Training Assistant [TA]) to enable "one-stop" creation, delivery, and management of Web-enabled multimedia training in operational

units of institutional environments. The report begins by summarizing the Phase I research and development, then describes the Phase II work in detail. The report closes with conclusions and recommendations for future research based on initial testing and evaluation of the Phase II product.

Phase I Research and Development

Phase I tasks included researching the Army training process, identifying methods for relieving the constraints on rapid, contextualized training development, and developing these methods into a prototype Army "Training Assistant" capability. The feasibility of developing a full-scale, Phase II TA for use by unit trainers was then examined. The Phase I objectives were as follows:

- Determine the *design requirements* for an Internet-enabled TA that supports the rapid development of contextualized training, to include identifying the (a) mission tasks and training objectives, activities, and format to be supported; (b) user interaction with the tool for generating structured training; (c) integration of generic content and operational digital products into the training development process; (d) format of tool output; and (e) additional features to enhance usability and acceptance.
- Determine the *technical requirements for building the TA architecture*, to include identifying the (a) search-and-retrieval functions to access operational database resources; and (b) communication modules necessary to enable the tool to communicate with multiple operational databases.
- Determine the *technical requirements for developing the TA front-end*, to include the order and links among Web pages to structure user interaction and generation of output.
- Determine the *feasibility of a full-scale TA capability* based on the Phase I research and development, to include identifying (a) challenges to full-scale development; (b) barriers to full-scale implementation; and (c) areas of greatest potential impact of the full-scale capability and their implications for managing the scope of Phase II development.

Phase I Research

The Phase I effort began with an analysis of the Army training process. The analysis consisted of a review of relevant doctrine (U.S. Department of the Army, 1984, 2002a, 2002b, 2003, 2003, U.S. Training & Doctrine Command, 1999, 2004), interviews of unit trainers, observations of pre-deployment training, and the application of in-house subject matter expertise. Interviewees included an infantry battalion commander recently returned from deployment, Army schoolhouse instructors located at Fort Leavenworth, KS, and observer/controllers at the National Training Center at Fort Irwin, CA. The purpose of this analysis was to gain an understanding of the Army's expectations for how training is developed and conducted. The results of this analysis informed the functional and technical design of a full-scale concept TA.

Unit Trainers

The Army training process analysis revealed that "unit trainer" can be conceived broadly to include tactical unit commanders, operations staff officers, non-commissioned officers,

schoolhouse instructors, and civilian contractors, among others. Unit trainers may be thought of as being directly or indirectly involved in unit readiness, depending on whether they are focused on imparting a broad education or on facilitating mission preparation.

Because the purpose of the TA is to support the rapid development of contextualized training activities, the initial scope of the TA concept design was limited to addressing the needs of individuals directly involved in small- to moderate-scale unit training: tactical unit commanders, operations and executive staff officers, and non-commissioned officers. Emphasis was placed on mechanized infantry and dismounted armor trainers because the effective functioning of these types of units is a direct determinant of success in the contemporary operating environment.

Training Activities

Unit trainers directly involved in unit readiness generate a variety of training activities that fall into one or more of three categories of training: individual, collective, and leader. The unit trainer's selection of a particular training activity depends on who is being trained and the resources available to conduct training. Conducting training in this way is consistent with the Army's crawl, walk, run progression of training difficulty, with the expectation that trainees would be challenged at a level that optimizes the trade-off between resource expenditure and training benefit.

The TA concept was designed to enable the rapid development of training via two main functionalities. First, the TA would allow unit trainers to create new training from scratch, assembling novel and existing materials to create a variety of training activities. This functionality is the heart of the TA and its core capability. Second, the TA would allow unit trainers to modify existing training that has been developed by others who have used the TA to create their own new training. This second functionality was intended to help trainers avoid duplication of effort by making the efforts of others easy to access and build upon (Kilner, 2002). Figure 1 below depicts the training activities supported in the TA concept. This selection of training activities would enable the development of individual, collective, and leader training activities that are not the primary responsibility of institutional education. The TA concept was designed to place emphasis on collective and leader training activities, which are difficult to create but critically important to mission success.

Individual
(may be individuals
in a group setting)

Collective

Leader

Officer Soldier All

Crew Sqd PL CO Staff-BN Staff-BDE PLs CO Cdrs

Sqd PL CO Staff-BN Staff-BDE

Seminar/
Lecture
Demonstration

Crew Drill
Sergeant's Time/
Team Training
Dplymt Ex

Battle Drill
SOP Reh
Dplymt Ex
STX
LFX

MDMP Training
CPX
Targeting Training
Battle Staff Drill
MAPEX/STAFFEX

TEWT
Msn Reh

TEWT
Seminar/
Lecture
Msn Reh
DMX

MDMP Training
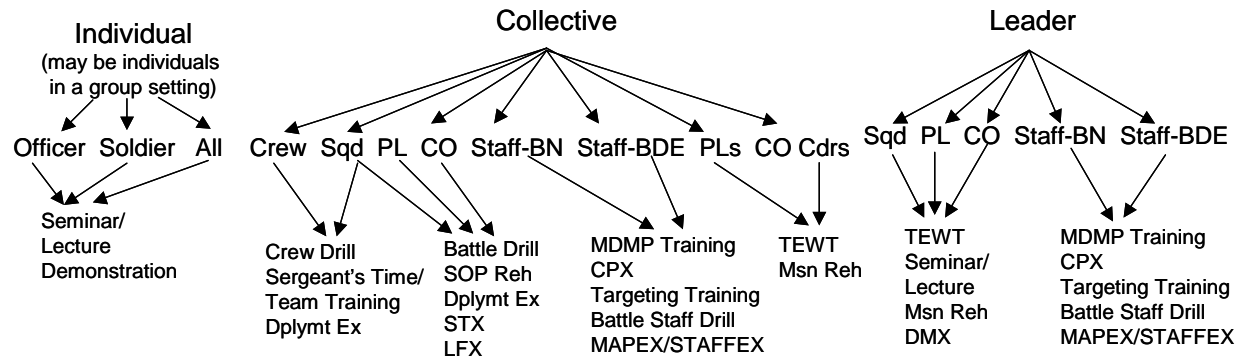CPX
Targeting Training
Battle Staff Drill
MAPEX/STAFFEX

Figure 1. Training Activities Supported in the TA Concept. The activities presented would enable the development of training that is not the primary responsibility of institutional education.
Note: See Appendix A for acronym list.

The Conduct of Training

Training may be conducted in a variety of ways, with differing implications for what unit trainers must develop to conduct a particular training activity. Individual training often is administered in the form of a computer-based training package, which can be delivered via the Web or on a compact disc. Unit trainers therefore develop individual training less often than they must monitor such training to ensure that Soldiers and leaders meet the training requirements. Exceptions include the seminar/lecture and training on individual practical skills. Collective training may be conducted as live exercises, computer-simulated exercises, tabletop exercises (technology-enabled or otherwise), or as simple thought exercises. In any case, the unit trainer must develop background materials to set the conditions for the exercise and to situate the trainees. Leader training may fall under the rubric of individual or collective training, depending on the training activity.

The TA concept was designed to produce a different output, depending on the training activity and format selected. Output could range from printable background materials to seminar/lecture presentation materials, to interactive computer-based exercises. For easy access, all output would be in the form of Web pages. These could be printed, presented, shared, and viewed simultaneously (though not in a distributed/collaborative fashion) without specialized software available on the computer by which the training is accessed. The Internet-enabled format of the output would allow trainers and trainees alike to access the TA from any computer that has Internet access, whether deployed or stateside.

Doctrinal Support for Training

Unit trainers generally attempt to make their training as doctrinally sound as possible. The Army supports their efforts by providing numerous resources for planning, conducting, and assessing training activities. The length and quantity of doctrinal training manuals slows down the training development process because substantial time is required to locate appropriate manuals and implement their guidance in training exercises. Moreover, many training developers

may be unaware that doctrinal support exists and therefore do not seek it out. Currently, there is no simple way for unit trainers to locate segments of doctrine for relevant training guidance, although searching for entire manuals is relatively straightforward via portals such as Army Knowledge Online (AKO). Many doctrinal manuals, including training publications, are well over 200 pages long, requiring non-trivial download times (especially for trainers using dial-up Internet connections) and significant review time to locate topics of interest.

These findings indicate that the TA could significantly enhance the training development process by making doctrinal resources readily available via a centralized source and in a format that enables easy insertion into training activities. Figure 2 features the high-level architecture of the TA concept system. As shown in the figure, the selection of a training activity by the unit trainer determines the set of queries the TA presents to support the development of training materials for that activity. Through this interaction with the TA, the trainer provides training content to the system for assembly into a complete set of training materials, including the content of the training activity itself as well as performance assessment criteria and feedback or after action review (AAR) materials, where applicable. The TA concept also provides content for the trainer. This content is based directly or indirectly on doctrinal resources and is relatively generic and modifiable to ease the training development process.
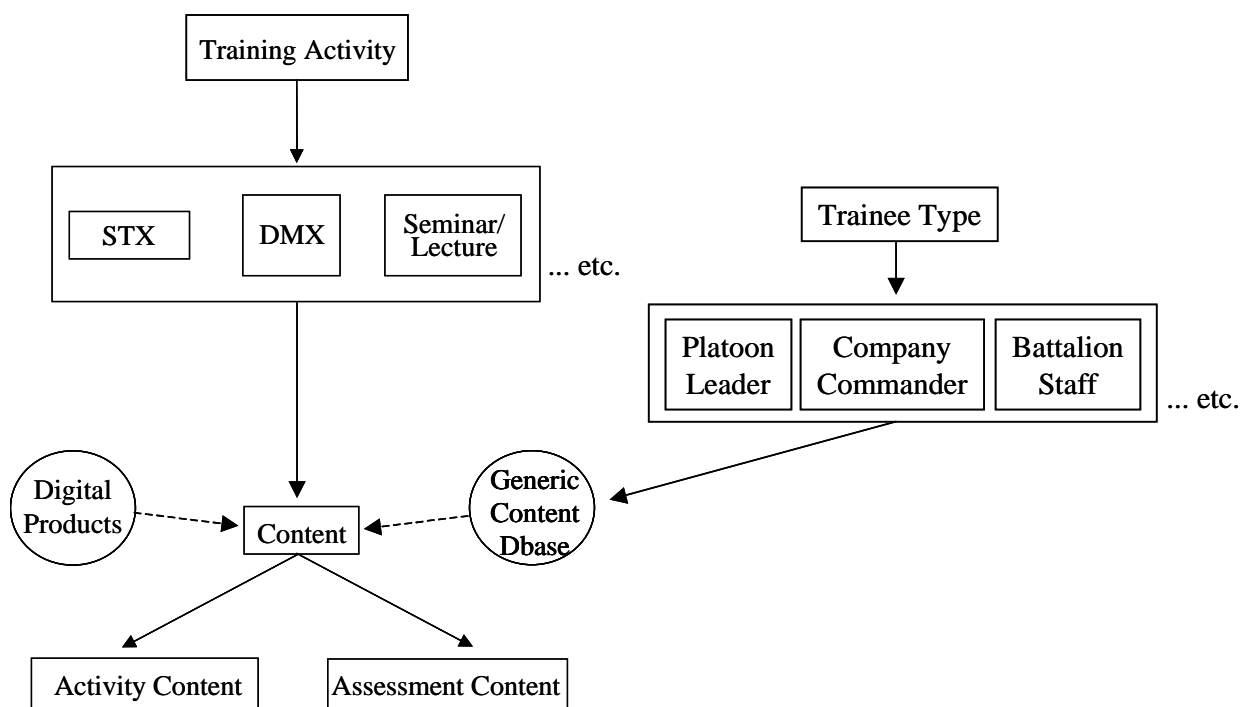
Figure 2. High-Level Architecture of TA Concept System. The selection of a specific training activity determines the set of queries that the TA will present to support the development of training materials for that activity.

Operational Databases and Training

Unit trainers contextualize training by matching the conditions and (to some extent) the standards used in a training activity to those conditions and performance requirements expected

to characterize a particular operational setting. There are two ways in which resources from operational databases can be used to provide context for training. First, elements in a database can be embedded directly into the training activities themselves. Training developers at the Fort Lewis (WA) Battle Command Training Center use this approach to integrate theater conditions and lessons learned directly into the training for units preparing to deploy (Jean, 2005).

Second, multiple elements in an operational database, such as informal documents and text messages, can be reviewed and synthesized to inform the development of training conditions and standards for mission tasks that are not well established in doctrine (i.e., new techniques and procedures). Synthesized operational database material may also be used to customize the conditions for established mission tasks, but in a more indirect way. Training developers at the National Training Center adopt this second approach. They use lessons learned from theater to determine opposing force tactics, civilian behaviors, and urban terrain characteristics that form the learning environment.

In order to support the development of contextualized training, therefore, the TA must enable users to embed operational products within a training activity and must provide easy access to the other materials available in the operational database for review and synthesis. The TA concept design assumes a single operational database, in effect a tagged file repository, consistent with the vision that at some future time all Army operational databases will be unified or interoperable. Because a single operational database does not yet exist, the TA concept capability was designed to communicate flexibly with different databases so that it can be implemented easily in a variety of locations. Figure 2 shows where in the training development process the TA concept integrates operational products. As TA queries request content from the user, the user may provide content by selecting digital products that are then embedded into the output of the TA.

Phase I Development

In Phase I, a prototype TA was developed to conduct a feasibility assessment of the TA concept. The Phase I prototype design featured a selection of the full-scale TA concept capabilities that best enabled the assessment.

Of the TA concept functions previously described, we focused Phase I effort on authoring new training activities from scratch because this functionality is the heart of the TA and its core capability. To manage the scope of the Phase I effort we designed the tool to support company commanders as trainers and platoon leaders as trainees. These leaders are likely to have the most rapidly changing training objectives and the least experience developing structured training. In addition, we focused our attention on developing the capability to author a decision-making exercise (DMX).

We used the Think Like a Commander (TLAC) adaptive-thinking training methodology (Lussier, Shadrick, & Prevou, 2003) as the basis for designing the output of the prototype TA DMX authoring capability. That is, the DMX output is designed to present to trainees a brief scenario depicting an ongoing situation (e.g., a patrol operation), its associated context (e.g., higher's mission and intent, status of friendly forces, general enemy tactics, etc.), and a set of

unexpected events that occur during the ongoing situation. The DMX output requires trainees to indicate the factors they would consider in deciding how to handle the unexpected events and allows trainees to compare the factors they identified relative to those identified by an expert (or experts).

The unit trainer creates a training activity through a series of queries that are specific to that training activity. To create a DMX, the queries shown in Table 1 below are used and information provided by the user (queries listed in order, grayed out areas are optional). A subject matter expert developed the generic content for the prototype TA, which is present in all of the required fields listed in Table 1 (except the selection of the background task). In general, fields in the generic content database are called up depending on the background task and trainee type selected by the unit trainer. However, some fields (e.g., rules of engagement, civilians, timing) are generic across all trainee types and background tasks. Generic content appears to the user as text already filled into a field, which may be modified or deleted, depending on the user's preference.

Table 1

DMX User Queries

Query	Form of User Input
Select Background Task	Pull-down menu selection or text entry
Select the Area of Operations (AO)	File upload
Specify Key Terrain Features	Text entry
Specify Higher Mission & Intent	Text entry
Specify Higher Task Organization	Text entry
Specify ROE/ROI	Text entry or file upload
Indicate Additional Context	Text entry or file upload
Specify Enemy General Tactics	Text entry
Specify Additional Enemy Intelligence	Text entry or file upload
Specify Recent Enemy Activity in the AO	Text entry or file upload
Specify Task Organization – Own Unit	Text entry
Specify Personnel/Equipment Status	Text entry
Specify Other Military Elements in the AO	Text entry
Specify Timing	Text entry
Specify Civilians	Text entry
Specify Unexpected events	Text entry
Specify Factors to consider – Keep a Focus on Mission/Higher's Intent	Text entry
Specify Factors to consider – Model a Thinking Enemy	Text entry
Specify Factors to consider – Consider the Effects of Terrain	Text entry
Specify Factors to consider – Use all Assets Available	Text entry
Specify Factors to consider – Consider Timing	Text entry
Specify Factors to consider – See the Bigger Picture	Text entry
Specify Factors to consider – Visualize the Battlefield	Text entry
Specify Factors to consider – Consider Contingencies and Remain Flexible	Text entry

Note: Shaded rows are optional fields.

There are several opportunities for the unit trainer to embed operational database resources into the DMX. These opportunities include inserting (a) depictions of a deployed unit's area of operations (i.e., map files or map files with graphics, photographs, sketches, or other graphic files); (b) rules of engagement/interaction used in theater; (c) additional contextualizing materials from an area of operations in theater (e.g., photographs, weather reports, incident reports, etc.); (d) additional enemy intelligence from deployed units' reports (i.e., intelligence reports such as person files, pattern analyses, etc.); and (e) information on recent enemy activity (i.e., fragmentary orders [FRAGO]).

Phase I Findings

Subject matter experts suggested that the TA concept has great potential for saving time, increasing productivity, and improving training. A full-scale capability enabling the development of several collective exercises and individual, small-group training activities would have broad impact and would be doctrinally sound and easy to use. Even after effort to manage the scope of the TA concept, however, it was determined that implementing the full-scale concept capability could not feasibly be accomplished in a Phase II effort.

Rather, it was found that the most feasible, influential, and immediately usable Phase II implementation of the TA concept should focus on supporting junior officers in the development of training activities not supported currently by doctrine, especially the DMX. The DMX is intended to train flexible responses to rapidly changing enemy tactics or other unexpected events, a training objective not well addressed by other doctrinal training activities but of greatest importance to junior officers. Because the DMX does not have a doctrinal structure, it is more subject to the lack of training development experience most junior officers have. Providing a structured DMX-development process based on best practice would enhance the training quality of DMXs Army-wide through reduced individual differences in instructional-design savvy and increased average capability. The DMX is also relatively easy to generate and simple to conduct in the short timeframe available to train rapidly changing techniques and procedures.

It was determined that there are several different, feasible ways in which the Phase I prototype TA could be scaled up to an operational Phase II product such that it enabled the rapid development of contextualized DMXs or other vignette-based individual, small-group exercises. Effective scaling up must enhance (a) the basic functionality of the tool to support modification of developed training; (b) the range of methods the unit trainer can use to create training exercises; (c) the instructional and technological sophistication of the TA output; and (d) the ease with which users can access resources from the operational environment.

The Phase I analysis of the Army training process directly informed the Phase II effort by identifying the common mission tasks most likely to be affected by rapidly changing conditions in the operational environment, providing a characterization of target audience expectations for the tool interface and output, and specifying the use of generic content and operational digital products in contextualizing a DMX. The Phase I technical analysis informed the Phase II effort by determining the search-and-retrieval techniques necessary to link operational database content to relevant components of the training development process.

Phase II Objectives

The operational Phase II product was intended to support unit trainers in rapidly creating DMXs involving digital products from theater in response to changes in the operational environment. Specifically, the Phase II product was intended to enable the unit trainer to rapidly develop interactive multimedia instruction that could support group discussion and feedback and that could train squad-, platoon-, and company-level Soldiers and leaders to identify the decision-making and mission-performance implications of specific changes in the operational environment, to include (but not be limited to) changes in:

- Enemy tactics;
- Rules of engagement/rules of interaction;
- Communication standing operating procedures (SOP);
- Host nation civilian attitudes/behaviors;
- Armor/equipment usage principles/procedures;
- Media standing operating procedures; and
- Task organization.

The objectives for the Phase II effort involved expanding significantly on the capabilities of the Phase I prototype including:

1. The development of interactive multimedia instruction using a combination of audio, text, and graphics, plus integration of digital operational products;
2. Structured user queries that are more broadly applicable than those required for conducting Think Like a Commander adaptive-thinking training (Lussier et al., 2003); and,
3. An enhanced working operational database and search capability and multimedia generic content to enable speed in generating relevant exercises.

The objectives for the Phase II research therefore were as follows:

1. Determine the architecture required for the TA to enable the development and use of interactive multimedia instruction that addresses rapidly changing conditions in the operational environment;
2. Determine the algorithms necessary to develop an Internet crawler that enables the population of a self-updating, adaptable working operational database using products from unit databases;
3. Determine the algorithms necessary to limit the searchable space of the working operational database based on individual user preferences;
4. Develop the architecture and crawler/search algorithms, implement these components in a coherent whole system; and
5. Test and evaluate the system functionality.

Phase II Research

Behavioral Research and TA Design

This section describes the behavioral research conducted to refine the TA design based on the Phase I research findings. This research included further examination of target user characteristics and the likely use environment. The purpose of this research was to ensure that the TA would optimally support the flexible development of DMXs and related training in a way that is easy to use and integrated into a larger instructional context that individualizes training. The research findings and design specifications presented in this section represent the *ideal case*, a completed system that represents a Phase III capability. Decisions to manage the scope of the Phase II product were made and are described in the Phase II Development section.

Method

Phase II behavioral research was conducted via a literature review and a series of interviews, both archived (i.e., conducted as part of another effort) and conducted as part of the present effort. The literature review included the scholarly and technical literature regarding interactive multimedia instruction design, evaluation, and authoring (e.g., Hays, Stout, & Ryan-Jones, 2005; Herrington & Oliver, 1995; Lee & Boling, 1999; Park & Hannafin, 1993). The intent of this literature review is to capture the human factors issues that must be taken into consideration when designing the TA, including interface features, training performance assessment, and promotion of trainee engagement in higher-order thinking.

The series of interviews was as follows: (1) 14 archived interviews with veterans of Operation Iraqi Freedom (OIF) [located in the digital library of the U.S. Army Command and General Staff College Combined Arms Research Library (CARL)]; (2) two focus groups conducted with 20 Soldiers of the 7th Squadron, First Cavalry Division immediately prior to their deployment to Iraq in October 2006; and (c) interviews with 10 observer/controllers at the Joint Readiness Training Center (JRTC) at Fort Polk, LA. The majority of the interviewees and focus group members (33/44) were enlisted Soldiers ranging from specialist to command sergeant major. The remaining interviews (11/44) were conducted with platoon leaders (lieutenants) and company commanders (captains). Interviewees and focus group members were armor, cavalry, infantry, military police, and field artillery Soldiers.

Findings

User Characteristics and Preferences – Trainers. Trainers comprise battalion commanders/S3s, company commanders (CO CDRs), platoon leaders (PLs), and non-commissioned officers (NCOs) or other enlisted personnel (especially first sergeants and platoon sergeants, but also possibly squad and team leaders) in the active or reserve component, who lead full-spectrum operations. Unit trainers also may include Department of the Army (DA) civilians or contractors located at a mission support training facility (MSTF) or home station operations center (HSOC). Trainers also include schoolhouse instructors responsible for developing junior officers and enlisted Soldiers (e.g., NCO Academy or Platoon Leaders'

Development Course instructors). Schoolhouse instructors may be active or reserve Army personnel, DA civilians, or contractors.

Trainers would use the TA to rapidly develop foundational interactive multimedia exercises for individuals and/or small groups. They also would access the TA to use/adapt exercises developed by other trainers and located in the TA archives. Foundational exercises should address single competencies or behaviors (e.g., react to ambush, coordinate mounted/dismounted operations, etc.) in order to enable deliberate practice and skill adaptability across a range of conditions (Lussier & Shadrick, 2004). Trainers also would use the TA to develop various types of small unit or key leader mission rehearsals (i.e., "digital tabletop," briefback, confirmation brief, and pre-combat inspection/check).

Unit trainers may approach the creation of exercises with a particular doctrinal task they wish to train (e.g., report tactical information). Alternatively, unit trainers may approach training with a general competency they wish to develop (e.g., communications skills). This competency generalizes across task types, although trainers may wish to situate general competency training within a particular task context (e.g., communications skills during a raid). Schoolhouse instructors likely will approach instruction from an educational (as opposed to training) standpoint, wishing to develop general competencies, such as adaptive thinking, military decision-making, etc. To illustrate, unit trainers may seek to train "react to contact [specifically improvised explosive devices (IEDs) on a particular convoy route to be secured]" whereas schoolhouse instructors may seek to expand Soldiers' and leaders' mental models of what a thinking enemy can do to reduce the likelihood of friendly success.

Trainers are familiar with mainstream software applications (especially Microsoft® Word and PowerPoint), Internet browsers (especially Microsoft® Internet Explorer), search engines (especially Google), knowledge management portals (especially Wikipedia, Questia, and Army-specific portals), and computer-based instruction. Commissioned officers, DA civilians, and contractors may have more familiarity with some software applications than NCOs and junior enlisted Soldiers, given (a) the greater demand on these personnel to prepare briefings and other documents; (b) their generally higher levels of education; and (c) their stronger orientation toward an "office" setting. However, NCOs and junior enlisted Soldiers in the reserve component may have more experience than their counterparts in the active component, due to their civilian jobs and education and their participation in Army distributed learning. Nearly all trainers are familiar with other mainstream technologies, including cell phones, digital cameras, and personal digital assistants. A small group of target users are advanced users of these technologies, using them innovatively in the field and for personal creative purposes.

With the possible exception of some schoolhouse instructors and MSTF/HSOC personnel, few trainers have formal education in instructional design. In designing training, most trainers prioritize realism over all other instructional characteristics. Where high-fidelity simulation can be achieved, even at the cost of other instructional best practices (including formal assessment and feedback), it usually is preferred (see Lussier & Shadrick, 2004). Aside from the mandate of training doctrine (DA, 2003), one reason for the preference of realism may be the possibility that high-fidelity simulation is better for developing the psychomotor, perceptual speed, and stress-coping skills involved in close-quarters combat. Schoolhouse

instructors may place lower priority on realism, given the emphasis their proponent schoolhouse plays on general education over mission preparation. In any case, the TA must have best practice in instructional design infused into its authoring component so that the training presented to trainees conforms to widely recognized guidelines for effective instruction.

The design of the TA must resonate with trainers' understanding of doctrine but be flexible enough to address necessary deviations from doctrinal practices, such as "train-as-you-fight." The rationale for and utility of using simple, targeted computer-based exercises for individuals and small groups must be made clear to trainers. For instance, the TA will prepare units for larger-scale collective exercises and it is a feasible training solution if collective exercises are not feasible. In addition, the TA is especially useful for key leader development. The argument that targeted computer-based exercises are better education than live action collective exercises likely will not resonate with users and is not recommended for generating interest in and engagement with the TA.

User Characteristics and Preferences – Trainees. Trainees comprise junior enlisted Soldiers, NCOs, and junior commissioned officers learning in line units or at the schoolhouse. Trainees may be in the active or reserve component. With regard to familiarity with computers, software applications, and other technology, trainees have similar characteristics as trainers. Trainees would use the TA to access and conduct training developed by their unit trainers or instructors. Trainees also may access the TA to conduct self-development using training residing in the TA archives.

The exercises produced by the TA must be easy for trainees to search, locate, and access. The exercises must be engaging and performance feedback must be immediate and perceived as fair. Some non-instructional bells and whistles, such as background music and two-dimensional animation, should be judiciously considered to enhance motivation to use the tool without making large demands on bandwidth or becoming too distracting.

When the TA Will Be Used. Trainers will use the TA to develop, use, or adapt exercises in response to a recognized training/educational need. Triggers for this need will include (1) changes in the operational environment; (2) receipt of a mission; (3) unit or student performance deficits (e.g., as revealed by an after-action review or student exercise); (4) gaps between unit skill sets and mission requirements; (5) the need to illustrate an instructional point (as in classroom instruction); and (6) recognition that training exercises will boost morale and unit cohesion in a relatively low-intensity operational environment.

Several types of changes in the operational environment may trigger a training requirement. Those most frequently occurring changes include:

- Changes in enemy tactics due to the adaptability of a thinking enemy or changes in the enemy itself [e.g., changes in IED employment methods (including location, time of day, delivery and/or triggering mechanism, strength, etc.), changes in IED technology];
- Changes to task type due to a greater demand for certain skill sets than are present in a particular task organization, requiring the development of established skill sets in novel

functional areas (e.g., infantry Soldiers doing military police or medic tasks, field artillery or engineers doing infantry tasks, etc.);

- Changes in mission type due to adaptive, last-minute changes given by higher, last-minute notification of mission, and sudden changes in the operational environment (e.g., enemy contact in the context of security or reconstruction missions or public affairs reaction in the context of combat missions, etc.);
- Changes in the equipment used to perform mission tasks due to the receipt of new equipment in the field;
- Changes in personnel in the unit due to adaptive, last-minute task organizations or personnel arrangements, the execution of combat missions while some personnel are on leave, or casualties; and
- Changes in coordination requirements due to joint operations with host nation security or military forces, with sister service units (e.g., Marines), and/or with allied forces.

Characteristics of the TA Use Environment. All target users (trainers and trainees) will require a system that is extremely easy to use and that offers some unique capability. Trainers have several easily accessible and, in some cases, higher fidelity alternatives with which they are already familiar. These alternatives include tabletop exercises using paper maps with acetate overlays, photographs, or scale models, Microsoft® PowerPoint presentations, group discussions with whiteboards or other shared visual/marking space, immersive tactical and cultural trainers, and equipment simulators. The TA must require little or no training to use, must be consistent (ideally, integrated) with the technologies that users are already familiar with, and must be stable.

The TA should be accessible anytime, whenever training/education is required -- during pre-deployment, the reception, staging, onward movement, and integration (RSOI) phase of deployment (e.g., in Kuwait), deployment itself, and formal education. Pre-deployment training should comprise exercises to prepare units for rotations through combat training centers and to address performance deficits revealed by such rotations. Pre-deployment exercises using classified operational products (actual or "scrubbed") from the unit to be replaced would enable training exercises that simulate the specific environment to which a unit will be deployed (Jean, 2005). Pre-deployment exercises could involve general skill development when deployment is anticipated but specific orders have not yet been delivered. The TA could be used during deployment by trainers conducting refresher or sustainment training, new skills training, leader development, and mission rehearsals. Schoolhouse instructors could use the TA at any time, for example, following a class period, to create learning experiences that are adaptive to student need or that illustrate an instructional point. Initially, the most common use of the TA will be for pre-deployment training and formal education because access to the Internet (both classified and unclassified) is limited in theater.

Figure 3 below shows the access that different types of trainers have to the public and classified internets, depending on location. Dashed lines indicate that access is variable, depending on such factors as the sophistication of Army presence in theater or the possession of a common access card (CAC) reader. Note in this figure that reserve component (RC) trainers do not have access to classified training locations on post or at their schoolhouse locations, located

at reserve facilities, whereas active component (AC) trainers do. Trainee access to the public and classified internets, regardless of installation type, is assumed to mirror trainer access.
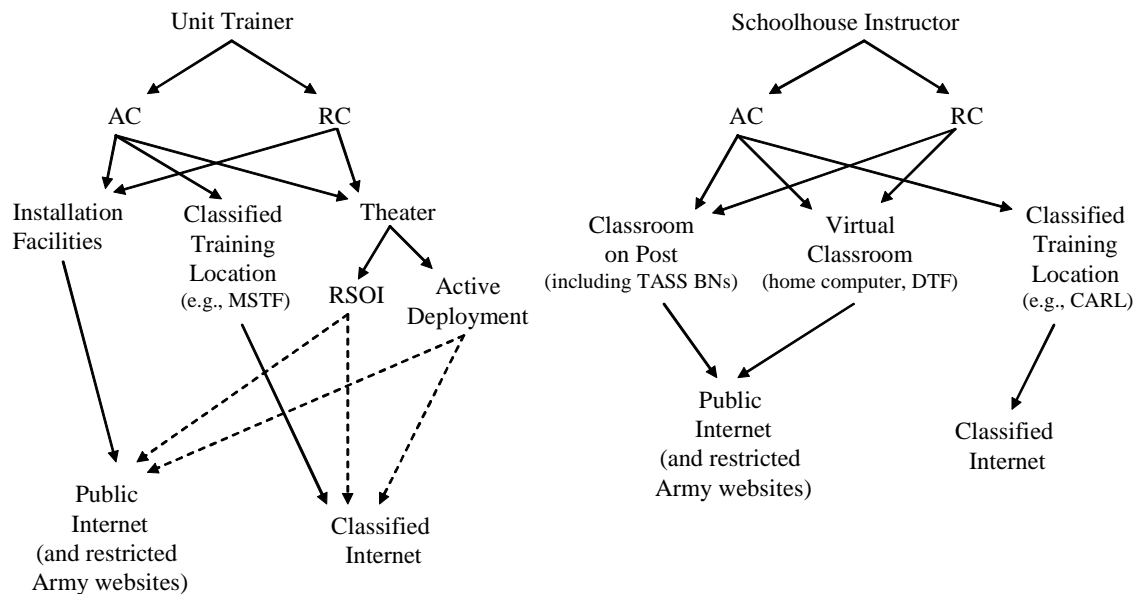

Figure 3. Access to Public Versus Classified Internet, by Trainer and Location Type. Dashed lines indicate variable access.
Note: See Appendix A for Acronyms List.

Target Skills/Competencies Trained by the TA. The TA should help trainers address a subset of the training needs most frequently identified by deployed or recently deployed leaders and Soldiers engaged in full-spectrum operations. Although the TA would be useful for enhancing particular skills in specific contexts (e.g., identify the location of enemy snipers during a dismounted patrol) or coordinating collective activity (e.g., as in mission rehearsal or synchronization training) the ideal use of the TA is for developing adaptive responses to sudden changes in the operational environment during the execution of a variety of mission tasks, including high-intensity conflict. The TA would be useful for developing adaptive responding because its design enables trainers to create exercises that require the same skill sets under a variety of conditions. That use of the TA would leverage its technological capabilities to accomplish learning outcomes that are more difficult or impossible to achieve using other means (i.e., because simulating multiple conditions quickly is not feasible).

The TA should not be used to address the subset of common training needs that are either better trained using accessible, higher-fidelity simulation (e.g., small arms marksmanship) or that are already addressed via interactive multimedia instruction used in Army distributed learning (e.g., equipment simulations available through LandWarNet e-Signal). The top-level categories of skills that should addressed by the TA include the following:

- Adaptive thinking/contingency planning;
- Application of rules of engagement and rules of interaction;
- Communications skills;
- Information management;

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- Interpersonal/cultural skills;
- Medical skills;
- Procedural skills;
- Rapid reaction to enemy contact;
- Synchronization and coordination;
- Tactical decision-making;
- Tactical perception;
- Various mission tasks (as in mission preparation or rehearsal); and
- Visual communications skills.

The nature of the skills or competencies to be developed is somewhat dependent on where the training takes place, because training location has implications for access to the public versus classified internet and for the relative emphasis placed on specific skill acquisition versus general competency development. For example, general competency development is more likely to occur in the schoolhouse setting whereas mission rehearsal is not expected to occur in the schoolhouse at all. In addition, in the schoolhouse setting, the likelihood of using the classified internet for training of any type is reduced due to the relatively minor educational payoff achieved with great difficulty accessing and "scrubbing" classified products or conducting classified training. Figure 4 below shows the expected relation between training location and type of training, with dashed lines indicating reduced likelihood of training type and absent lines indicating zero likelihood.
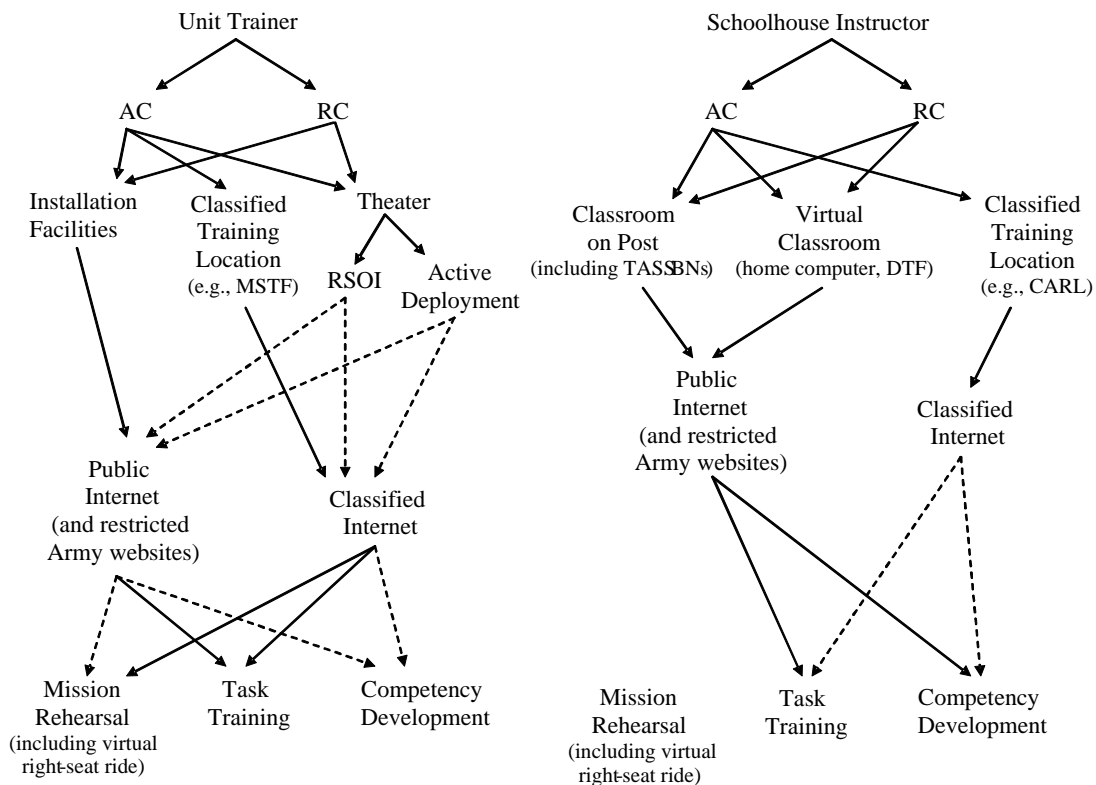

Figure 4. Training Type as a Function of Location and Internet Access. Dashed lines indicate reduced likelihood of training type. Absent lines indicate zero likelihood of training type.

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General Overview of TA Training Products. Several principles exist to support the design of interactive computer-based instruction and should be applied to the TA authoring output. The principles address interface characteristics to enhance usability, utility, and attractiveness and instructional design features that promote self-directed learning, reflective practice, collaboration, and retention. The key elements of TA training products therefore should include (a) advanced organization of instructional content (including learning objectives, overview of the training product, etc.); (b) a doctrine-based tutorial on the basic training/educational concepts; (c) expert perspectives on the learning topic; (d) alternative approaches to executing the task to be learned (i.e., demonstrations of the task to be trained under varying conditions); (e) a summary of the learning material presented in the tutorial, expert perspectives, and alternative approaches; and (f) an interactive practical exercise (or set of exercises) for the learner to conduct for practice, assessment, and feedback (Hays et al., 2005; Herrington & Oliver, 1995; Park & Hannafin, 1993).

Creating Practical Exercises. Based on the Phase I findings described previously, the focus of the TA training authoring function should be on the development of scenario-based practical exercises. Two major components of practical exercises must be authored–scenario content and interactivity.

Scenario content should be authored using an interface in which trainers can insert text, photos, video, and audio to create a dynamic presentation. Addition and modification of training content should be achieved via direct manipulation so that trainers may see the immediate effect of their actions on the training product. This component of the authoring capability would enable trainers to decide the degree of technical sophistication they wish to apply to their training exercise, ranging from text only to full-scale multimedia.

Interactivity should be authored using one of several standardized activity templates. Templates facilitate authoring by providing a means to focus and constrain author actions in a way that produces useful, standardized, and structured training. Templates also allow instructors with little or no programming skill to easily create interactive exercises. The following templates were identified to cover a wide range of learning objectives (LOs):

- Overlay Creation–An exercise that requires the trainee to drag and drop icons and/or draw figures on specific locations on a background graphic (e.g., map, sketch, photo, etc.). General feedback from the trainer is provided and the trainee self-evaluates the correctness of his/her answer.
- Test Question–An exercise that requires the trainee to answer one or more multiple-choice, true/false, or "select all that apply" questions. Student answers are assessed automatically and explanatory feedback written by the trainer is displayed.
- Self-Evaluation–An exercise that requires the trainee to create a free-text response to an open-ended scenario provided by the trainer. General feedback from the trainer is provided and the trainee self-evaluates the correctness of his/her answer.
- Synchronous Collaboration–An exercise that requires multiple trainees to move/add/remove icons on a shared whiteboard. This template does not support the provision of feedback, but rather is designed to provide a simple means for conducting collaborative rehearsal.

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- Situational Judgment–An exercise that requires the trainee to review a situation and rate the quality of a number of ways of handling the situation. This template is particularly useful for exercising trainees' ability to think through "non-tactical" problems (e.g., dealing with uncooperative civilians) that do not have a single correct answer or where no appealing answer is available. Feedback from the TA involves showing a trainee's ratings compared to those of the trainer and other trainees.
- Location Selection–An exercise that requires the trainee to point and click to points on a 2D graphic (e.g., map, photo, sketch, etc.) to demonstrate knowledge of where things are or should be located. Trainees receive visual feedback on the points that were not correctly identified, along with the trainer's overall rationale for the preferred solution.

The TA must have an architecture that links template types to the trainer's development objectives. The present research indicated such an architecture must allow flexible entry into the system (e.g., by selecting a doctrinal task or a general competency) and must fit with user expectations regarding the structure of training exercises (i.e., that they are situated in a specific task context and have explicit learning objectives.)

To meet these requirements, a background task can be used to situate one or more learning objectives. In this way, trainers can build multiple practical exercises using the same background materials. This format also enables deliberate practice of selected elements of larger training tasks by breaking the tasks down into their component parts. Recommended background tasks include:

- Conduct a route reconnaissance (also termed a route reconnaissance patrol);
- Establish an observation post;
- Reconnoiter a built up area (also known as urban reconnaissance);
- Assault a building;
- Conduct a presence patrol;
- Conduct a raid (also known as a type of combat patrol);
- Conduct a security patrol;
- Conduct convoy escort;
- Establish a checkpoint or traffic control point;
- Search a building;
- Secure a route (also known as IED patrolling);
- Cordon and knock or Cordon and search;
- Conduct an attack;
- Conduct a defense; and
- Conduct a movement to contact.

These background tasks were selected based on (a) the frequency of their occurrence as reported by Operation Iraqi Freedom and Operation Enduring Freedom combat veterans; (b) their centrality in pre-deployment training conducted at the Joint Readiness Training Center; (c) their representativeness of full-spectrum operations tasks; and (d) their presence in emerging maneuver doctrine (e.g., DA, 2002b).

Recommended learning objectives were derived by reviewing doctrinal training plans (e.g., DA, 2003) and selecting performance measures and/or supporting collective tasks associated with each background task listed above. Performance measures or collective tasks were <u>not</u> selected if they were (a) difficult to address with interactive multimedia instruction or better addressed using some other medium; or (b) not strongly associated with common training challenges experienced at home and in the field. Selected learning objectives are shown in Appendix B, which presents a complete list of each of the background tasks and their associated LOs. For trainers who conceptualize their developmental goals in more abstract terms, LOs may also be associated with general competencies (see Appendix C).

To summarize, each learning objective is associated with a particular activity template (described above). Trainers may arrive at a learning objective and associated activity template by first selecting a background task or a general competency. As noted in the next section, templates associated with a particular combination of background task and learning objective(s) should feature generic content to accelerate the authoring process. Authors may also choose to introduce a new background task and/or learning objective, but generic content cannot be supplied for novel task-learning objective combination templates.

Enhancing Training Development. To be useful, the TA must support more rapid generation of better training content. The training creation process could facilitate the rapid development of targeted training packages and exercises through (a) the provision of generic, modifiable content; and (b) the ability to search for up-to-date training artifacts and information on trends in the operational environment. Resources that the TA can provide to trainers for enhancing training development should include –

- Reference materials (e.g., doctrine, professional articles, discussion posts, other archived exercises, existing computer based training (CBT) related to the training topic
- A searchable database of training artifacts (including photos, maps, documents, illustrations, video, etc.)
- Generic content [e.g., training advance organizers with objectives, topic tutorials, practical exercise descriptions, etc., and practical exercise materials (e.g., scenario content, generic rules of engagement, signal operating instructions, etc.)]

PhaseII Development – Overview of the Tool

The TA was designed to serve as a training delivery tool, an authoring tool, and a learning management system (LMS). This section begins with a discussion of the scope of the TA, and then describes the various features that allow it to serve these three functions, and concludes with a detailed description of the TA search feature.

Scope Definition and Tool Selection

System Programming

Back-End Database. The TA system was designed with a Microsoft structured query language (MS SQL) database to organize and store the data. This platform was chosen because

of its scalability and fast data access. The TA MS SQL database was designed to be as flexible as possible, allowing data to be extracted for many purposes, even those not currently programmed. Additionally, new tables and fields can be added to the database as needed to support more advanced functionality, such as the ability to create classes, assign learners to classes, and assign training to classes.

Front-End Interface. The front-end user interface was created with Microsoft ASP.NET active server pages, which can easily access the MS SQL database and present information in a user-friendly manner. Additionally, most of the complex programming is run on the server, rather than the user's machine, leading to faster and more consistent system performance.

Multimedia

The Phase II behavioral research identified a number of types of multimedia (e.g., images, video, and audio) that would be beneficial to incorporate into the TA. However, due to a number of factors, the team decided to focus primarily on images. The following access and usability factors played into this decision:

- Images are the most widely used and available type of multimedia;
- Most trainers have the knowledge and ability to create images, while the same is not true of video and audio; and
- Images are much smaller in file size, leading to faster downloads and training that is accessible to users with varying Internet connection speeds.

Although it is not currently possible to incorporate videos into training, videos were included in the search feature so that they will be available for incorporation when programming is added during future development cycles.

Activity Templates

Time constraints prevented the development of all six of the identified activity templates. Therefore, three templates – overlay creation, test questions, and self-evaluation – were chosen for development based on their wide applicability (e.g., test questions and self-evaluation) or potential to add unique capabilities to the training (e.g., overlay creation).

Overlay Creation Tool Selection. Selection of the tool that would power the overlay creation template was an important decision. Many users on Army networks do not have the ability to download or install additional software. Therefore, the overlay tool needed to be available from a Web browser and require no additional software installation. A number of tools and technologies were investigated, but it was ultimately determined that a Macromedia Flash-based tool would be the best answer, as Flash Player is available through a Web browser and is a standard install on all Army computers. Additionally, Flash Media Server, which allows synchronous access to the same data from multiple computers, was incorporated so that the tool can also be used to support the synchronous collaboration template when it is created in later development phases.

Content Delivery Tool Features

The TA allows users to view and complete training that has been created in the system. Upon login, all users are taken to the "My Training" page. This page looks slightly different for each user, but it always contains a table of training modules that the user has been assigned to complete. For each module, the author and date of last access are displayed. A user must click the title of the training to be taken to its table of contents. From there, the user can select a section (e.g., introduction, basic tutorial, practice exercise, etc.) and proceed through the course. Each section of training is described below in the discussion of TA authoring features.

Authoring Tool Features

Course Creation

As described above, the Phase II behavioral research identified fifteen doctrinal background tasks and thirteen skills for which training might commonly be developed by TA users. These doctrinal tasks and general skills allow trainers to begin training development using a framework that is familiar to them. Trainers have two options from which to choose when creating new training: to use or modify existing training or to create new training from scratch. To adopt the first approach, users can search the TA to determine whether other trainers have created training on the same task and LO. If a user finds existing training that is applicable, they can create a copy and use it as the base for his/her course (Figure 5).

Figure 5. "Copy Existing Training" Function. If trainers find existing training that meets their needs, they can copy that training and use it as the foundation for their own course. In this example, a link to "Copy to My Training" is available for each of the existing courses.

When creating new training from scratch, TA users are presented with either doctrinal tasks or the general skills from which they will make a selection (Figure 6). As described above, the TA architecture links each doctrinal task and general skill to multiple associated LOs. Trainers can select one or more LOs for their training. Once the task and LOs have been selected, trainers confirm their selections and choose a title for their training (Figure 7). Once they click the "Save" button, new training is created.

All training created from the pre-defined tasks and LOs has a default structure so that TA users can rapidly create pedagogically sound training (Figure 8). This structure consists of an introduction and summary for the training module and then specific sections for each LO: "Basic Tutorial," "What Right Looks Like," "Modified Approaches," and "Practical Exercise." The Basic Tutorial section provides a general overview of the LO. The "What Right Looks Like" section presents an open-ended scenario and demonstrates a correct approach to that scenario through text and images. The "Modified Approaches" section details situations where Soldiers' approaches may change based on changing environmental or situational factors. Finally, the "Practical Exercise" section gives the learners a chance to apply what they have learned by completing a scenario-based exercise. The learning activity type represented in the practical exercise is dependent on the LO. The association between LO and practical exercise learning activity was made to maximize the similarity between learner interaction with the training content and the behavioral requirements of the operational setting.

Figure 6. Selecting a Task for a New Training Module. When creating new training from scratch, trainers can select from doctrinal tasks and general skills. In the example presented here, a trainer has selected the doctrinal task "Reconnoiter a Built-Up Area or Urban Reconnaissance."

Figure 7. Creating a New Training Module with Three Learning Objectives. The TA architecture links each doctrinal task and general skill to multiple associated learning objectives, so that trainers can select one or more learning objectives for their training. In this example, a trainer has chosen to develop doctrinal training and has selected three learning objectives (i.e., Adjust a plan based on new intelligence; Consolidate and reorganize; Interact with local nationals). He has titled the training "Reconnoiter a Built-Up Area or Urban Reconnaissance Training."
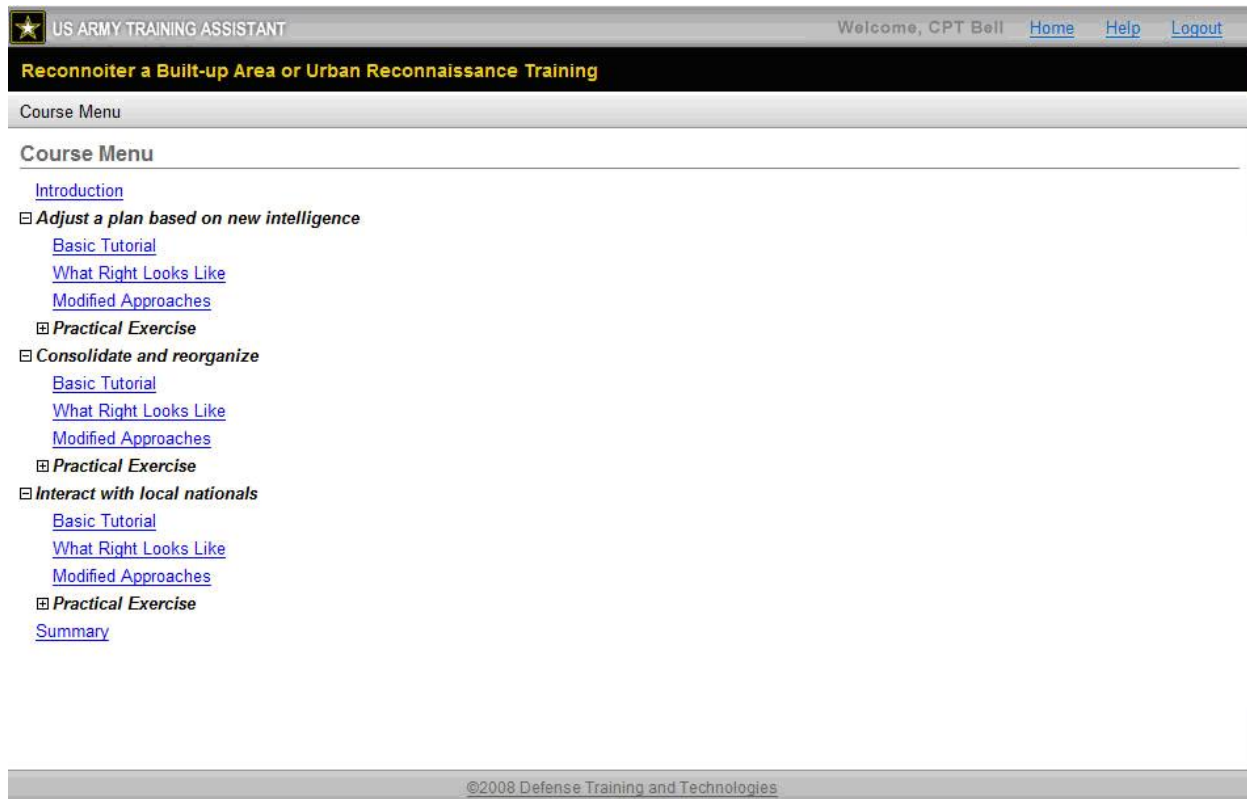
Figure 8. The Automatically-Generated Course Menu for a New Training Module. All training created from the pre-defined tasks and learning objectives has a default structure. This structure consists of an introduction and summary for the training module, as well as specific sections (i.e., "Basic Tutorial," "What Right Looks Like," "Modified Approaches," and "Practical Exercise") for each learning objective. In the example shown here, the default structure for "Reconnoiter a Built-Up Area or Urban Reconnaissance" and the three selected learning objectives are shown.

Base Content

In addition to the default course structure, which helps ensure that TA users generate comprehensive training, the TA also generates default pages within each section. These default pages contain what is called "base" or "generic" content, meant to be widely applicable to many training situations. The intent of the base content is to accelerate the training development process. During the Phase II development, base content was created for two tasks (Route Security and Building Assault) and three learning objectives (Plan a Mission – Conduct a Map Reconnaissance/Establish Control Measures, Plan a Mission – Conduct an Attack, and Determine the Purpose and Effect of Indirect Fires). However, any new content added by trainers and made public is searchable and usable by other trainers. In this way, the base content will become richer and more robust as the system is used.

Editing Static Pages

Even though the TA provides base training content, the trainer has complete control over the content and can edit or delete anything that is not applicable to her training. When viewing the course, the trainer will see an "Edit" button in the upper right corner of each page (Figure 9). Clicking this button will take the trainer into edit mode, where they will have the option to edit the text and images appearing on the page.
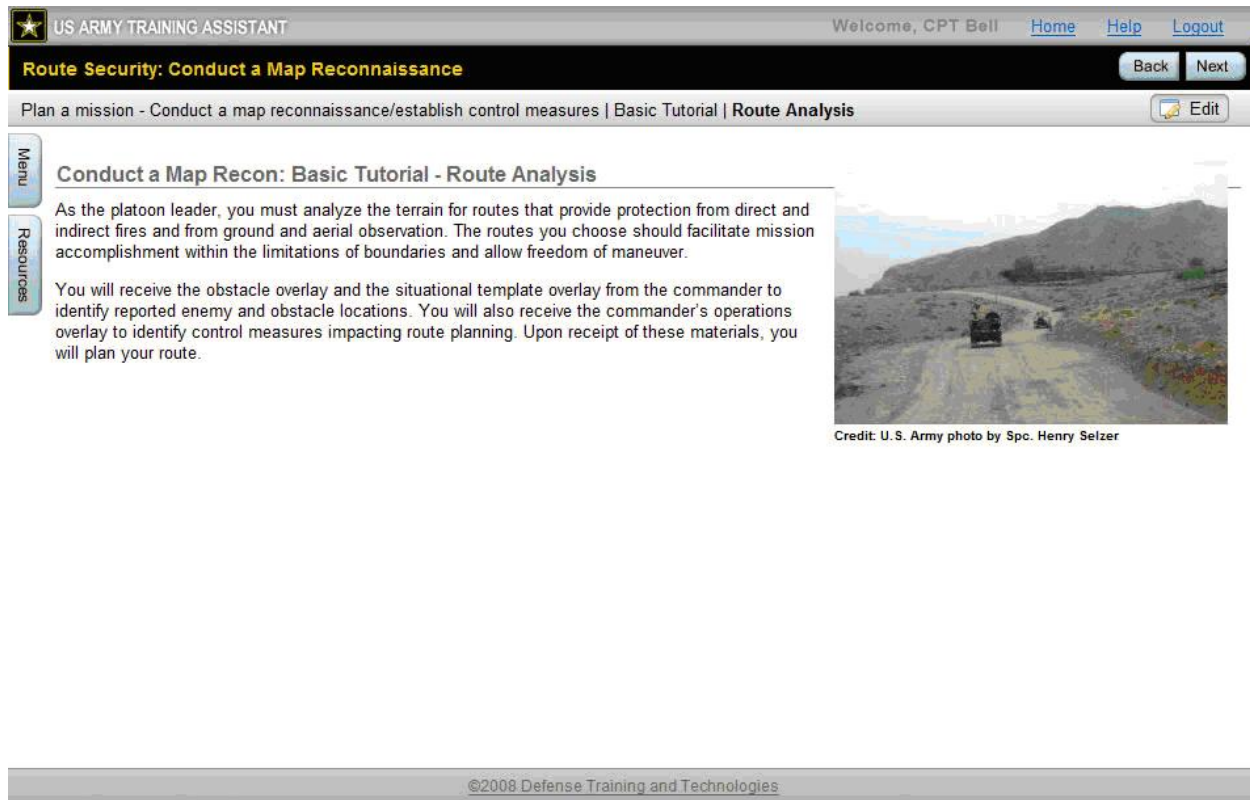
Figure 9. The Page "Edit" Button. When using the TA, trainers have complete control over course content. If they find content that they wish to edit or delete, they simply click on the "Edit" button, which appears in the upper right corner of every page.

Text is edited through a simple text-editor that appears inline on the page (Figure 10). The editor contains easily recognized icons allowing the trainer to change the font, size, color, alignment, and other properties of the text. The text-editor also allows the trainer to insert a hyperlink to another website (Figure 11) or search for content using the built-in search feature, which is described in a later section of this report.
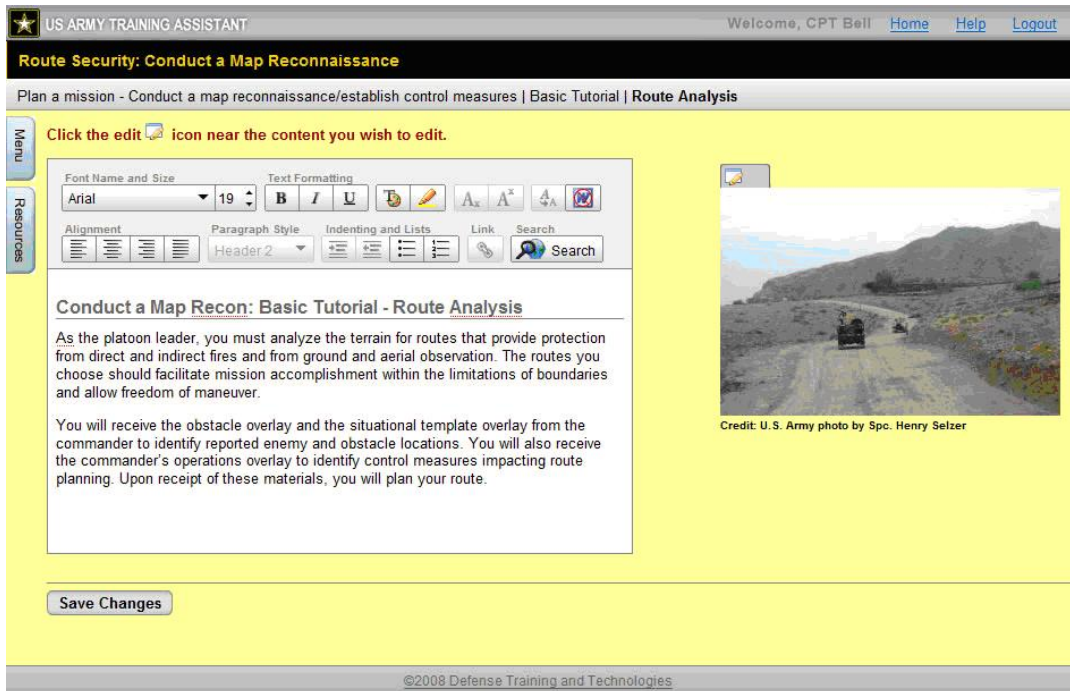
Figure 10. The Inline Text-Editor. Easily recognized icons allow trainers to change the font, size, color, alignment, and other properties of the text.
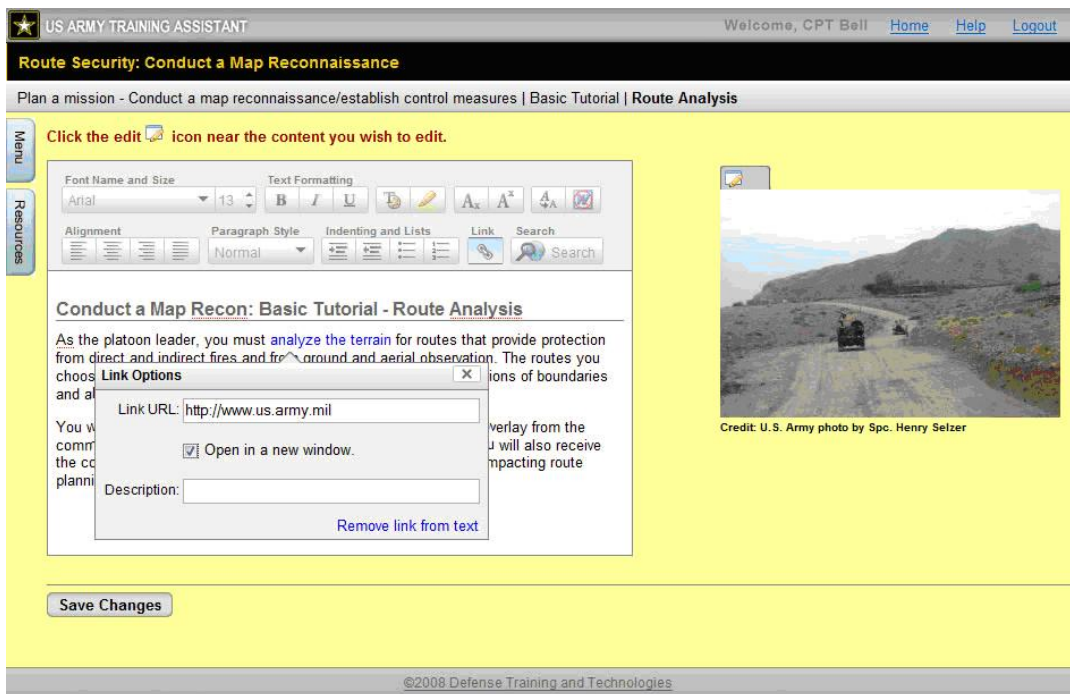
Figure 11. Inserting a Hyperlink. Clicking on the "Link" button in the text-editor allows trainers to quickly insert a hyperlink to another website.

When editing images, the trainer has multiple options. First, the trainer can choose to modify the current image by changing its size or adding a caption (Figure 12). Second, the trainer can upload a new image from his/her computer and specify properties such as size, caption, image credit, and whether the image is searchable and usable by other trainers (Figure 13). Finally, the trainer can use the built-in search feature to search for an image on the Internet or in other training created using the TA.

Figure 12. Setting Image Properties for an Existing Image. Trainers can modify an existing image by changing its size or adding a caption. In this example, a trainer has set the image size at "Quarter-page width" and has allowed for full-size images in pop-up windows.

Figure 13. Adding Image Properties to an Uploaded Image. Trainers can upload images from their computers and specify properties such as size, caption, image credit, and whether the image is searchable and usable by other trainers.

Editing Activity Pages

      Each practical exercise contains one or more activity pages, or templates. The necessary activity templates were determined through the Phase II behavioral research and were designed to reinforce learning by allowing learners to interact with the training content. Three of the six activity templates identified by the research have been developed: Overlay Creation, Test Questions, and Self Evaluation. Each template allows the trainers to ask questions, provide possible responses, and incorporate feedback for the learners. The difference between templates is how the learners interact with the content to provide their answers.

      Map Overlay Creation. The map overlay creation template allows learners to draw their own map overlays based on a scenario written by the trainer. The trainer provides a base overlay, containing the map and any other symbols that should be present to describe the situation (Figure 14). The trainer then provides an answer overlay, which depicts the trainer's "preferred" version of the overlay, along with an explanation of why each element was placed where it was (Figure 15). When learners visit the activity page, they see the base overlay and a drawing interface that allows them to add their own lines, text, and symbols (Figures 16-19). Using the scenario as a guide, learners create their own map overlay. Once they are satisfied with their overlay, they submit their answers. Upon clicking submit, the trainer's answer overlay appears, along with an explanation for the trainer's choices. The learners can then compare their overlays with the

trainer's overlay. All learner overlays are saved in the system so that the trainer can review them at a later time.
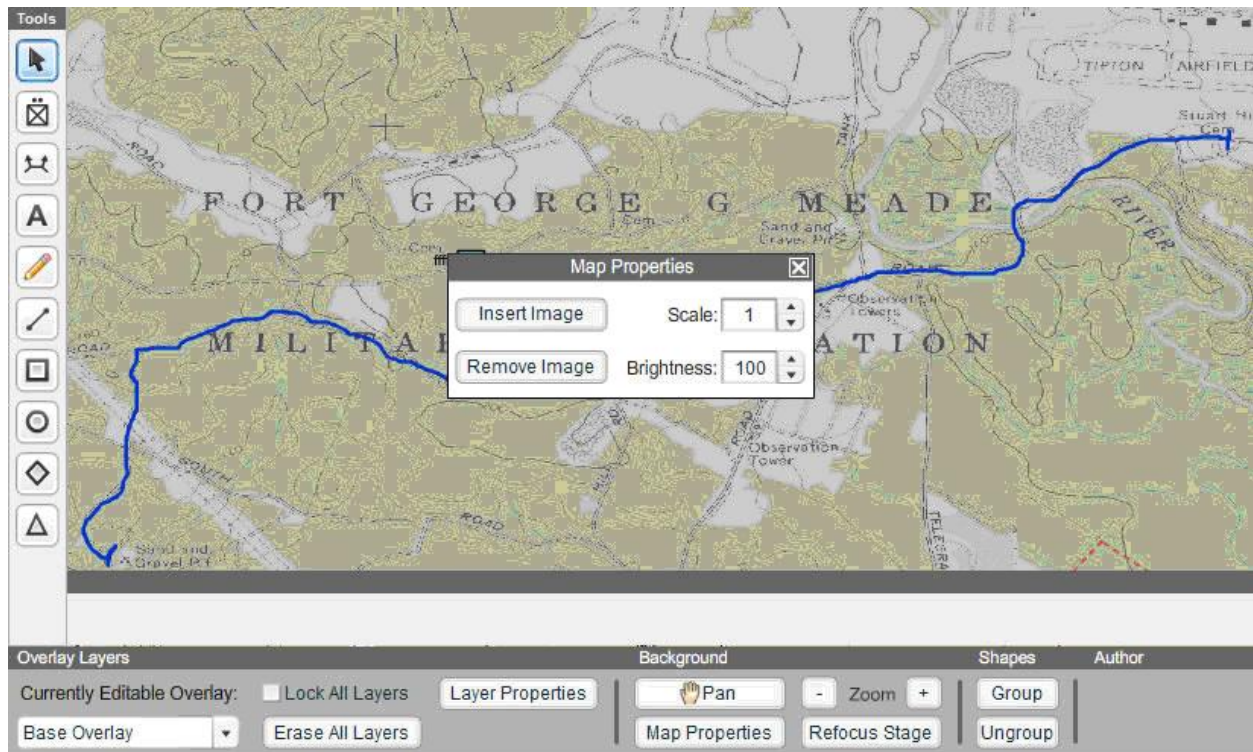
Figure 14. Inserting or Changing the Properties of the Map Background Image. In the example illustrated here, a trainer has clicked on the "Map Properties" button at the bottom of the page, which will allow him to insert an image, remove an image, or adjust image scale and brightness.
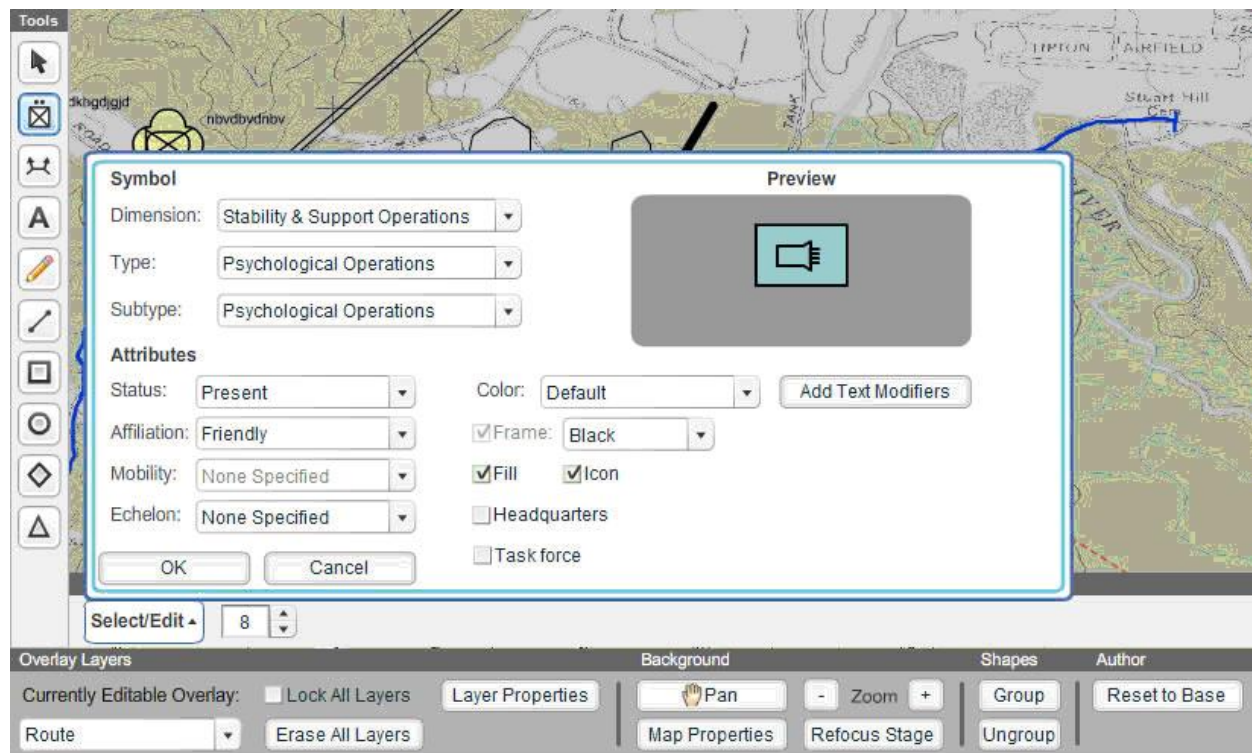
Figure 15. The Military Symbol Editor. In this example, a trainer has clicked on the "Military Symbols" button (second button down, from top left of page), which will allow him to insert and edit military symbols. Trainers can also edit the color, fill, and text associated with military symbols.
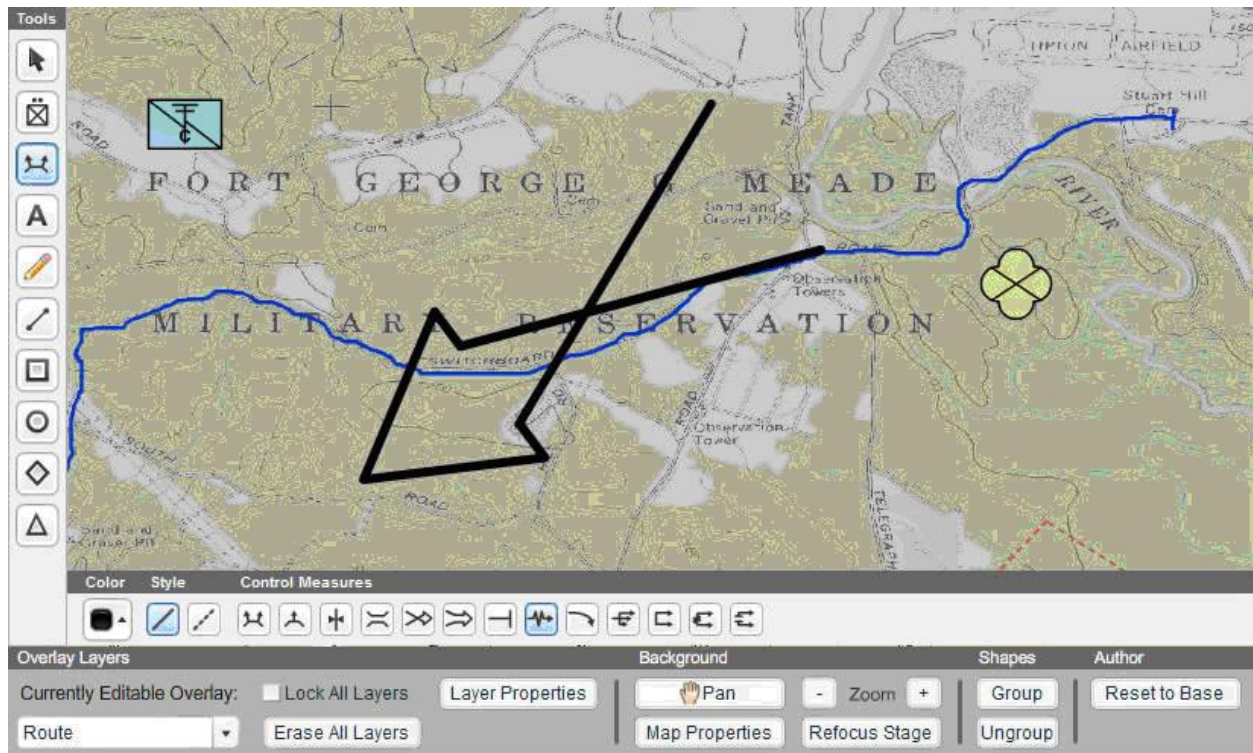
Figure 16. The Control Measures Tool. In the example presented here, a trainer has clicked on the "Control Measures" button (third button down, from top left of page), which will allow him to insert control measures such as axis of advance, fix, disrupt, bridges, and bypasses. Trainers can also edit the color and style of control measures.
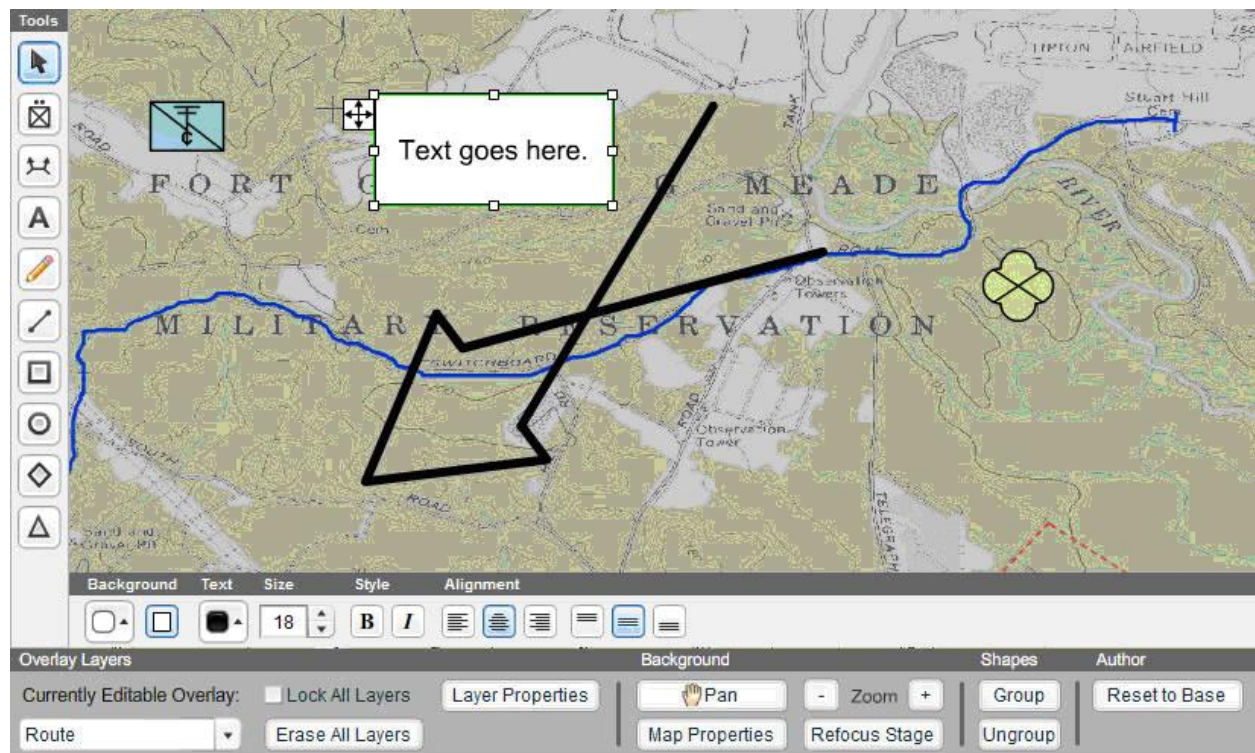
Figure 17. The Text Tool. In this example, a trainer has clicked on the "Text Tool" button (fourth button down, from top left of page), which will allow him to insert and edit text. Trainers can change the background color, size, style and alignment of text on their overlays.
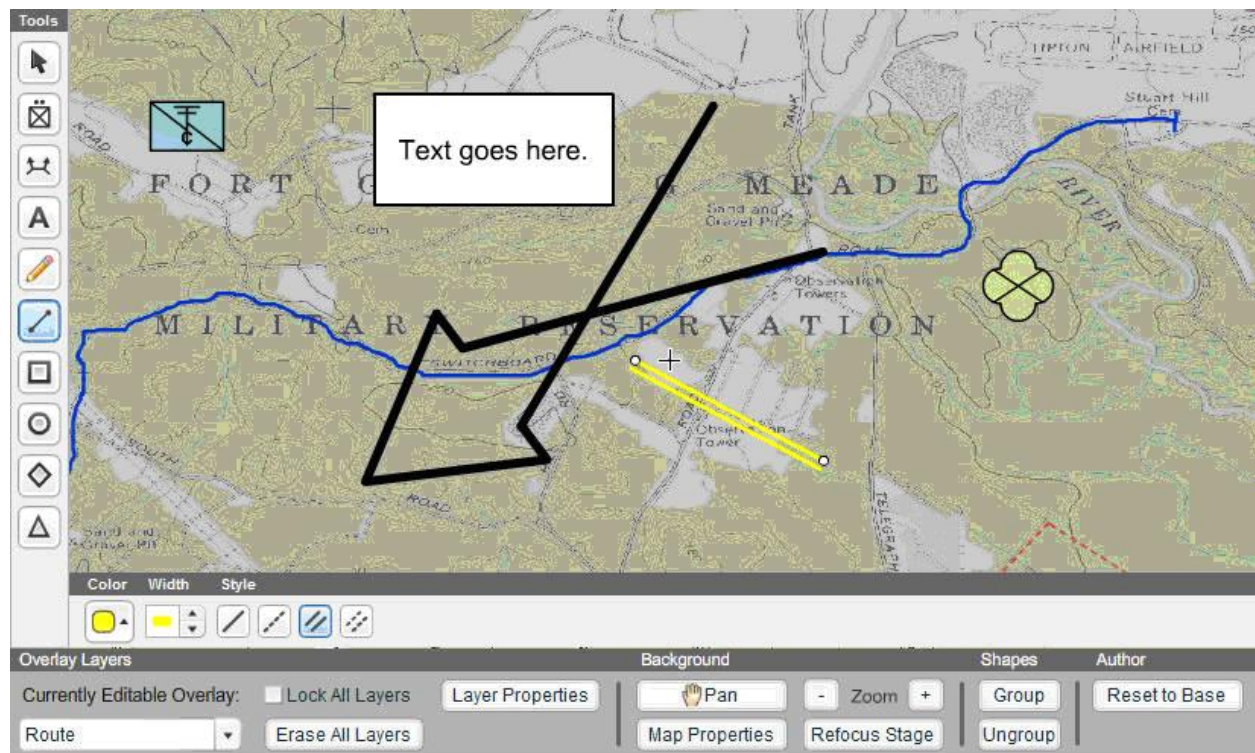
Figure 18. The Line Tool. In the example shown here, a trainer has clicked on the "Line Tool" button (sixth button down, from top left of page), which will allow him to draw and edit lines. Trainers can change the color, width, and style of lines on their overlays.
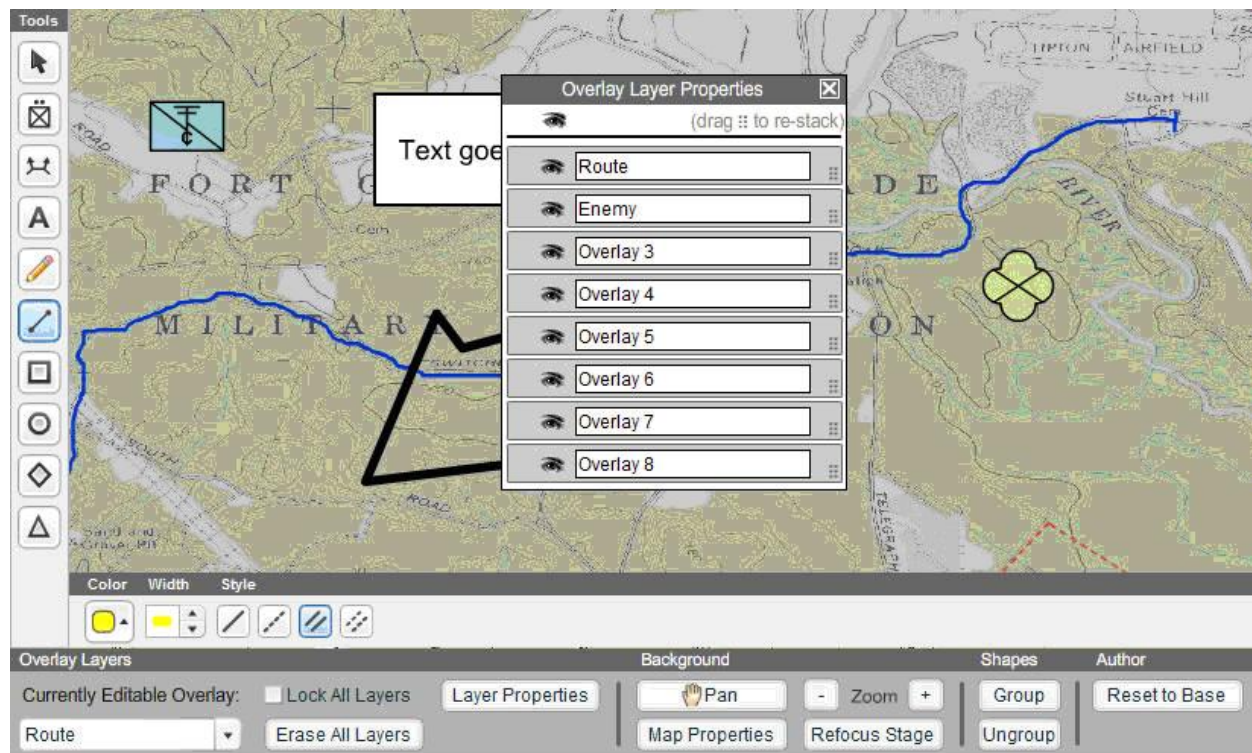
Figure 19. The Overlay Properties Window. In this example, a trainer has clicked on the "Layer Properties" button (bottom center of page), which will allow him to rename and re-stack layers.

Test Questions. The test questions template allows the trainer to create multiple-choice, true/false, or "select all that apply" questions to test learners' knowledge (Figure 20). In addition to indicating the correct answer, the trainer has the opportunity to provide custom feedback explaining to the learner why her choice was or was not correct. The system evaluates learners' responses and saves them so that they can be reviewed by the trainer at a later time (Figure 21).

Figure 20. Editing a Test Question. The test questions template allows trainers to create multiple choice, true/false, or "select all that apply" questions to test learners' knowledge. In the example presented here, a trainer has selected a multiple choice question with four answers to choose from. He has also identified the correct answer, and added feedback for correct and incorrect responses.

US ARMY TRAINING ASSISTANT   Welcome, CPT Bell   Home   Help   Logout

Building Assault: Determine the Purpose and Effect of Indirect Fires   Back   Next

Plan the employment of fire support - Determine the purpose and effect of indirect fires | Practical Exercise | **Question 1**

Practical Exercise: Question 1   Jump to...

What type of unit would be best suited for SBF-2?

✔ ◉ CAAT
○ Tank
○ Field Artillery
○ All of the above

You have already answered this question.

Feedback

That is correct. The CAAT will consist of ground forcescharged with the security of the breach point and mobile security asrequired. A tank would not be thecorrect response due to the tank's limited mobility and munitions capability.

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Figure 21. Evaluation of Learner's Response and Display of Trainer's Feedback. In addition to indicating the correct answer, trainers have the opportunity to provide custom feedback explaining to learners why their choices were or were not correct. Additionally, the system evaluates the learners' responses and saves them so that they can be reviewed by trainers at a later time. In this example, a learner has selected the correct answer to a multiple choice question, and the feedback for that correct answer is shown.

Self-Evaluation. The self-evaluation template is designed to give learners the ability to answer an open-ended, free-response question posed by the trainer. The system does not evaluate the learners' answers, but instead the learners compare their answers to the answers provided by the trainer (Figure 22). As with other activity templates, the learners' responses can be saved for later review by the instructor.

The self-evaluation template is designed to give learners the ability to answer an open-ended, free-response question posed by the trainer. The system does not evaluate the learners' answers, but instead the learners compare their answers to the answers provided by the trainer (Figure 22). As with other activity templates, the learners' responses can be saved for later review by the instructor.

Figure 22. Feedback Displayed After a Learner Answers a Self-Evaluation Question. The TA's self-evaluation template is designed to give learners the ability to answer open-ended, free-response questions. The system does not evaluate the learners' answers, but asks learners to compare their answers to those provided by the trainer. In the example shown here, a learner is provided with the answers of a trainer and asked to compare his answers to the trainer's answers.

Course-Level Management

In addition to supporting changes to content on individual pages, the TA also provides some course-level editing abilities. First, trainers are able to recycle training that is no longer relevant. The training is moved to the recycle bin (Figure 23), where it can be retrieved for up to 30 days. At the end of the 30-day period, the training, and any student records associated with the training, will be deleted. Additionally, training can be renamed at any time by clicking the "Rename" button next to the training title on the My Training page (Figure 24).

| My Training | All Training | Create New Training | Recycle Bin |

Recycle Bin

All courses in the recycle bin will be permanently deleted on the delete date listed. To recover a course from the recycle bin, click the "Recover" button.

	ID	Title	Last Edit	Delete Date
Recover	232	Course that is ready to be recycled	13/05/2008 12:50:00 PM	7/02/2008
Recover	264	Route Security: Coordinate with Adjacent Units	29/05/2008 1:27:25 PM	6/28/2008
Recover	265	Route Security: Coordinate with Adjacent Units	29/05/2008 1:27:41 PM	6/28/2008
Recover	267	Route Security: Coordinate with Adjacent Units (3)	29/05/2008 1:29:05 PM	6/28/2008
Recover	266	Route Security: Coordinate with Adjacent Units (2)	29/05/2008 1:28:37 PM	6/28/2008
Recover	223	Sample Training	29/05/2008 10:43:14 AM	7/06/2008
Recover	326	Presence Patrol Training TEST	16/07/2008 11:52:56 AM	8/15/2008
Recover	273	Presence Patrol Training TEST	2/06/2008 10:11:05 PM	7/04/2008
Recover	296	Conduct a Raid or Combat Patrol Training	3/06/2008 4:14:47 PM	7/04/2008
Recover	325	TEST QUESTION test training	6/06/2008 3:02:19 PM	10/03/2008

Figure 23. The Training Recycle Bin. Trainers can recycle training that is no longer relevant. When training is moved to the recycle bin, it can be retrieved for up to 30 days. In this example, training courses, their last edit dates, and their delete dates are shown, along with the "Recover" button for each course.

Figure 24. Renaming a Training Module. From the My Training page, training courses can be renamed at any time by clicking the "Rename" button. In the example illustrated here, a trainer has clicked the "Rename" button, and is editing the name of a course currently called "Conduct an Attack Training TEST."

Learning Management System (LMS) Features

In addition to authoring features, the TA incorporates a number of features usually found in an LMS, such as role-based logins, training organization and access, and the ability to store user data.

Role-Based Logins

Currently, the TA features three different roles: administrator, instructor, and student. The student role is reserved for learners who will be accessing content, but who will not be creating training. When students access the tool, they only see the "Training I'm Taking" table (Figure 25), and do not have any of the training creation buttons along the top of their screens. Additionally, when taking a course, students do not have the option to edit the content (Figure 26). Finally, when completing practice exercise activities, students are allowed only one attempt and are unable to answer any questions a second time.

Training I'm Taking

Completed	ID	Title	Author	Last Access
☐	230	Route Security: Coordinate with Adjacent Units	Jones	3/14/2008
☐	96	Blank Generic Course	Smith	3/11/2008
☐	95	Reconnoiter a Built-up Area or Urban Reconnaissance Training	Smith	3/16/2008
☐	161	Route Security (or IED Patrol) Training (Generic Content)	Jones	3/18/2008
☐	162	Building Assault Training (Generic Content)	Jones	3/19/2008

Figure 25. Students' My Training Page. The student role is reserved for learners who will be accessing content, but who will not be creating training. In this example, a student learner has accessed the TA. Because he will not be creating training, he only sees the "Training I'm Taking" table. He does not see any training creation buttons along the top of the screen.

Menu

Resources

Coordinate With Adjacent Units: Basic Tutorial - Introduction

The ultimate goal of adjacent unit coordination is to ensure unity of effort in the accomplishment of the higher unit's mission. In the context of a route security mission, adjacent units may provide the resources and support necessary to reach the destination point safely and efficiently. Adjacent unit coordination is done face-to-face when possible; however, the mission and environmental factors may require coordination to take place from a remote location.

Regardless of where coordination with adjacent units takes place, it is essential that coordination address general communication protocols, unit positions, routes of travel, location of key points along the route, and fire support.

Credit: U.S. Army photo by Pfc. Shea Butler

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Figure 26. Students' Course Page. Student learners will not have access to the "Edit" button, normally seen by administrators and instructors in the upper right corner of every page. In the example shown here, a student learner can read a basic tutorial on route security, but does not have the option to edit the page.

The instructor role incorporates all of the features of the student role with the additional ability to create, edit, rename, and delete content – all of the features discussed in the authoring section above.

The administrator role incorporates all of the features of the student and instructor roles, but also adds administrative abilities. Administrators have the ability to approve new user accounts (Figure 27). In addition to approving user accounts, administrators can determine the role into which a new user will be placed. The second important ability that administrators have is the ability to assign training to students (Figure 28). Once training has been assigned to a student, that student will see the training appear on her/his home page when s/he logs in.

Figure 27. Administrators' Account Approval Page. Administrators have the ability to approve new user accounts and determine the role into which new users are placed. In this example, the administrator sees that one person is awaiting approval for the student role. By clicking on the "Change Role" button, the administrator can also approve instructor and/or administrator roles for that person.
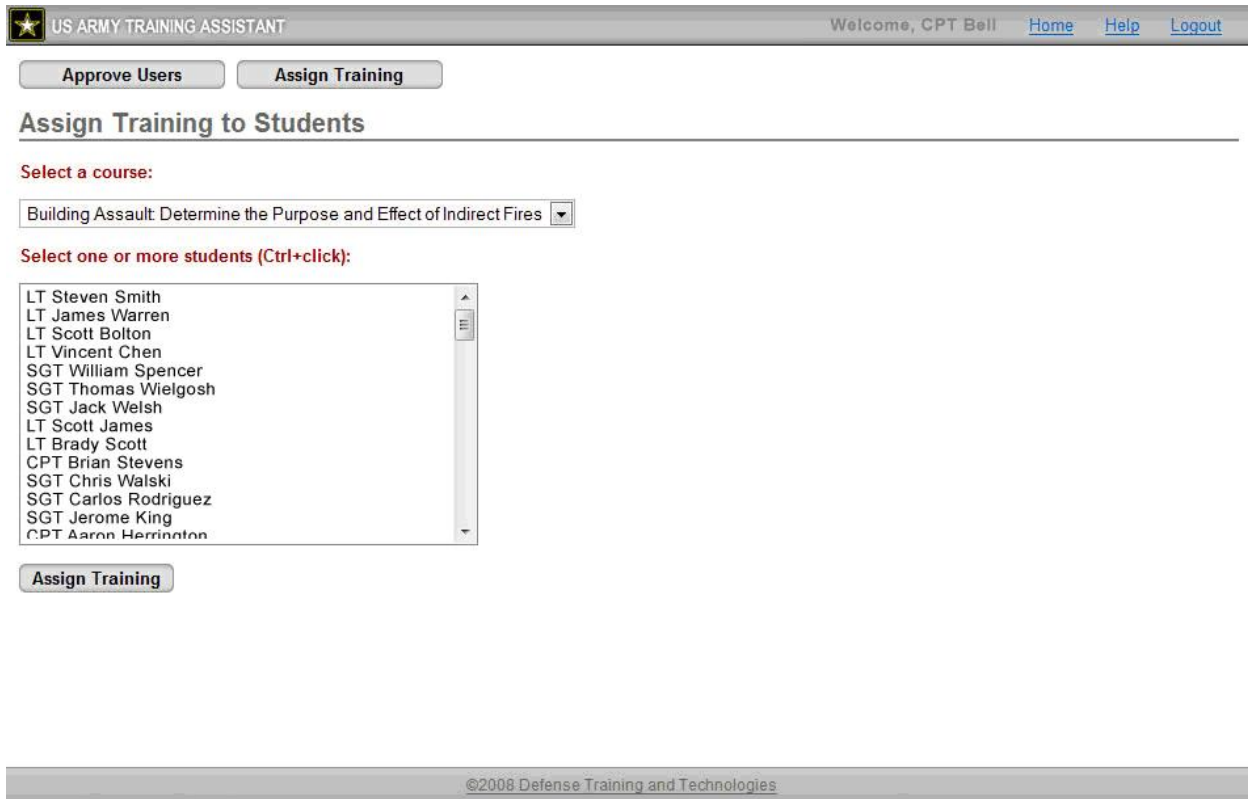
Figure 28. Administrators' Assign Training Page. Administrators also have the ability assign training to students. In the example illustrated here, the administrator views a list of students to which he can assign a course entitled "Building Assault: Determine the Purpose and Effect of Indirect Fires."

Search Feature

The TA offers trainers the ability to search for content to incorporate into their training. Access to the search feature is provided in both the text and image editing interfaces. This section discusses the search feature interface, as well as the design of the search feature. It concludes by outlining the three different ways in which content is obtained when a user performs a search.

The Search Interface

The search interface was designed to present search results for multiple types of content (text content, images, and videos) on a single page, while keeping the results organized by type (see Figure 29). This was accomplished through the use of results "panels." Each panel contains results for one type of content, and panels are expandable and collapsible to conserve screen space. By modularizing the panels, we are able to present an integrated view of information, while maintaining a simple user interface. Within each category, the TA search feature integrates search results from up to three sources (the local TA database, the surface web, and the deep web) into a single list.
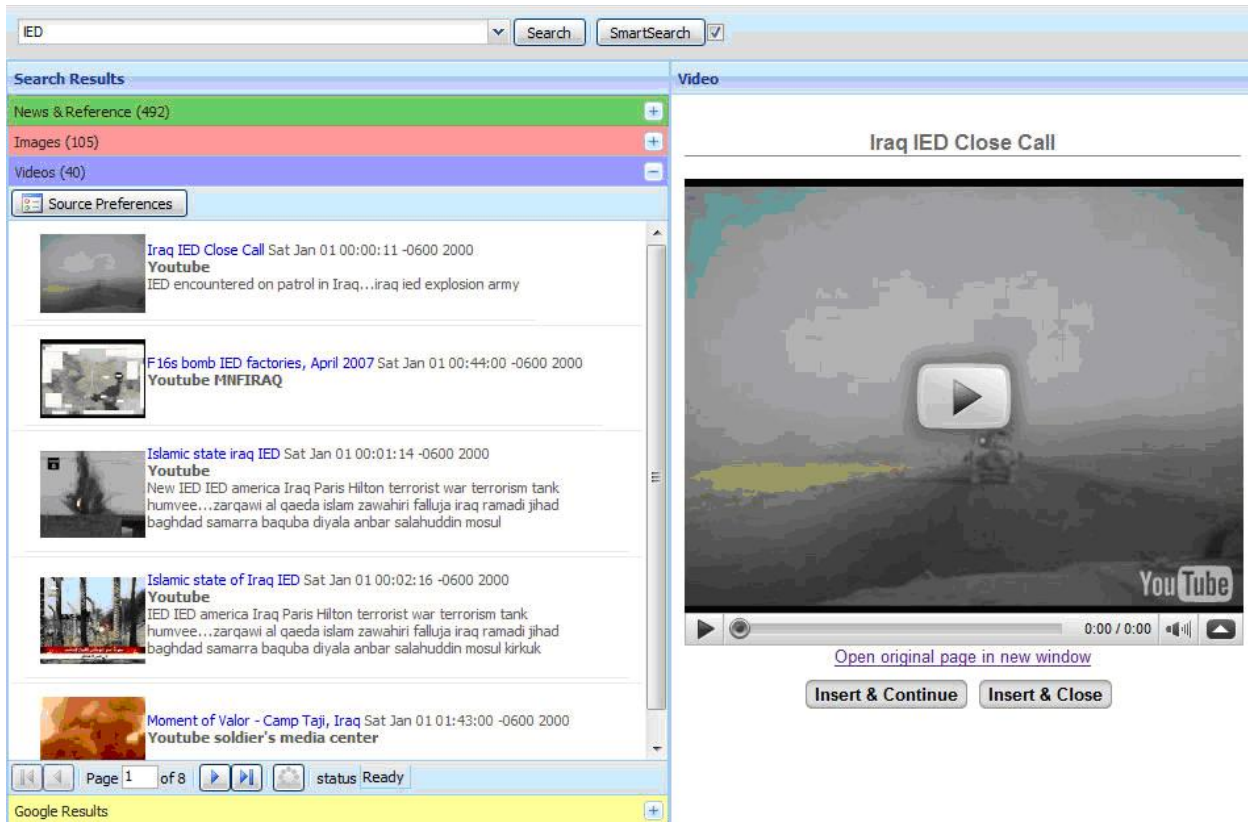
Figure 29. Search Interface. The search interface was designed to present search results for multiple types of content on a single page, while keeping the results organized by type. Panels are expandable and collapsible to conserve screen space. In this example, one can see on the left side of the page the "panels" containing search results for news, images, and video. On the right side of the page, one can see the preview area.

Each type of content has its own search results presentation. For news and reference, the title, date, and a short snippet of text are presented, along with any search terms highlighted. For images and videos, thumbnail images are displayed, along with a title and description, if applicable. At the bottom of each panel, paging links are being displayed for navigational purposes. Additionally, a status indicator in each panel shows the progress of the search for that panel.

Entering Search Terms. To initiate a search, users can type in their own search terms or use the auto-suggestion feature to see related keywords for the current page (Figure 30). Once the user clicks the "Search" button, the results panels are populated with results. To help increase the relevance of a search, users can choose to enable the SmartSearch feature.
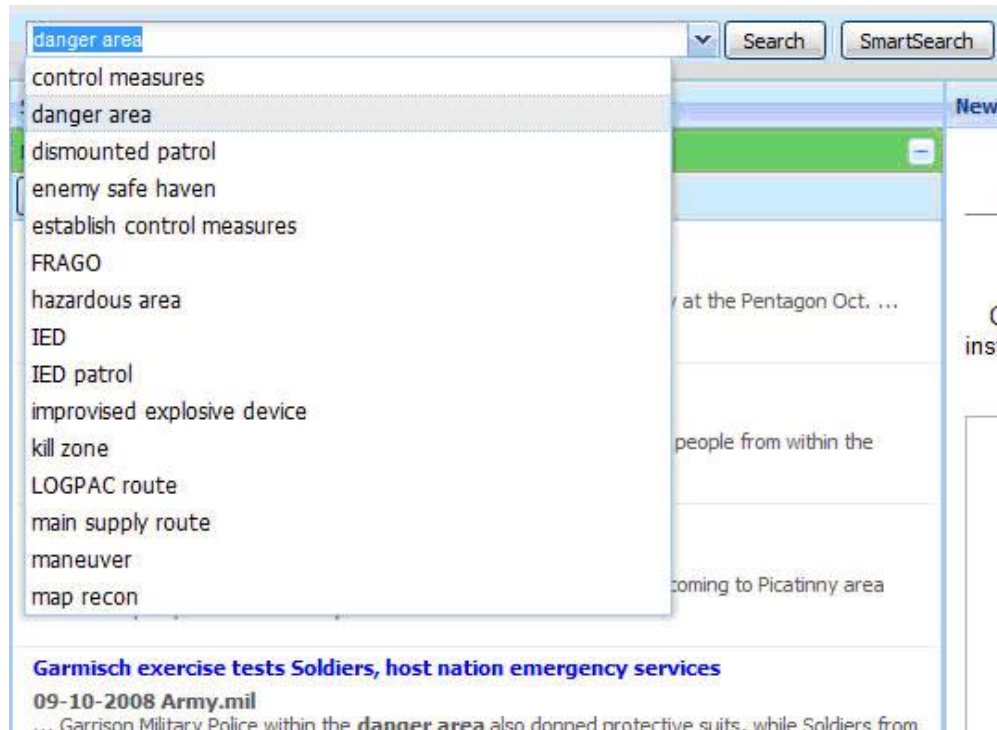
Figure 30. Search Term Auto-Suggestion. When using the search interface, users can type in their own search terms or use the auto-suggestion feature to see related keywords for the current page. In the example presented here, a trainer views a list of keywords generated by the current page.

SmartSearch. Due to the way in which the system is designed, users must initiate searches from within content pages. Because each page is associated with a background task and a learning objective, the TA is able to determine the general type of content for which the user is searching. As part of the Phase II behavioral research, search keywords were identified and linked to tasks and LOs. These default keywords can then be used to assist with a user-initiated search. "SmartSearch" may be turned on/off by the user.

When SmartSearch is enabled, the TA searches not only for the user-entered search terms, but also for the default keywords associated with that page. In the background, each default keyword is sent to an agent for searching. The user is also able to view the list of default keywords associated with the current page, and can choose to include or exclude each one from the SmartSearch (Figure 31). For example, a user is editing a page on Route Security and enters "IED" as the search term. The default keywords associated with the route security task include "route" and "security." With SmartSearch enabled, the TA will search for results matching "IED," "route," and "security," giving those results that match all three a higher ranking. Without SmartSearch, the TA will only search for "IED." Therefore, SmartSearch has the ability to produce better ranked results, but the cost is that the search will take longer to complete since more terms are being searched.
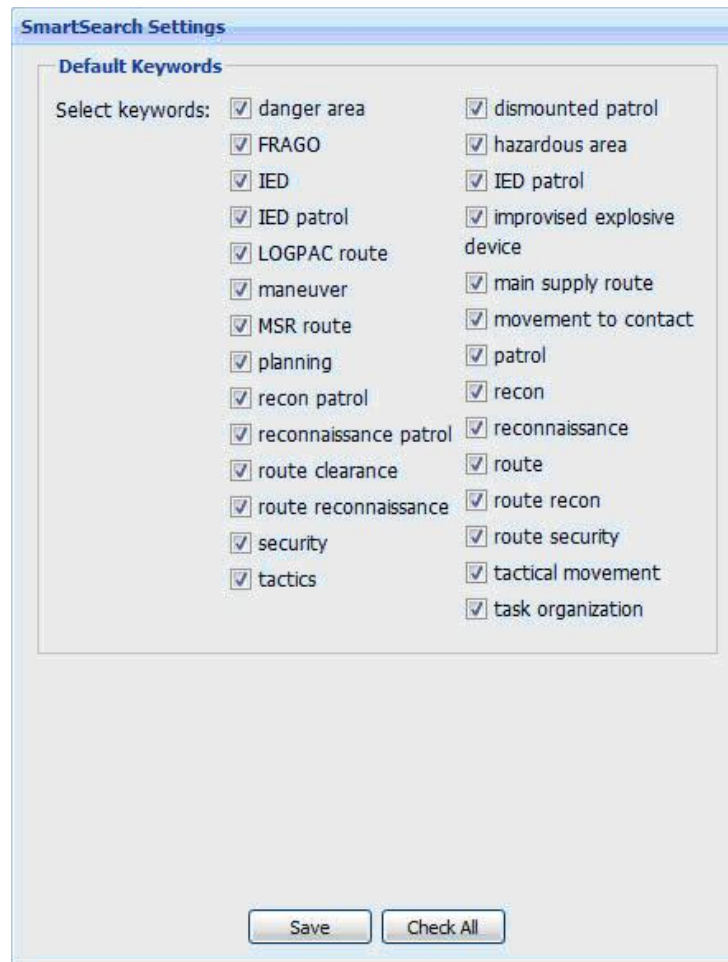
Figure 31. SmartSearch Keyword Selection. When SmartSearch is enabled, users can view a list of default keywords associated with current pages, and they can choose to include or exclude keywords from the SmartSearch. In this example, a user has chosen to include several keywords, including "route clearance," "security," "route," "patrol," and "IED."

Search Result Rankings and Filtering. Once results have been obtained from each of the three sources (the local TA database, the surface web, and the deep web), they are integrated and ranked in relation to one another. For the news and reference results, the ranking is based on the date, with more recent articles receiving a higher ranking, and also on the degree to which they match the search term(s). For images and videos, local TA results are given the highest rankings. The remaining results are ranked based on whether they were acquired from a site with a military domain and then based on their original rankings on the sites from which they were obtained. The surface web results are ranked according to their term frequency-inverse document frequency (TF-IDF) scores, as detailed in the surface web search section below.

In addition to ranking the search results, the TA gives users the ability to filter the sources that are searched (Figure 32). For example, a user may wish to exclude local TA content from the search. Un-checking the "TA Database" box in the filter window will remove all local results from the results panels.
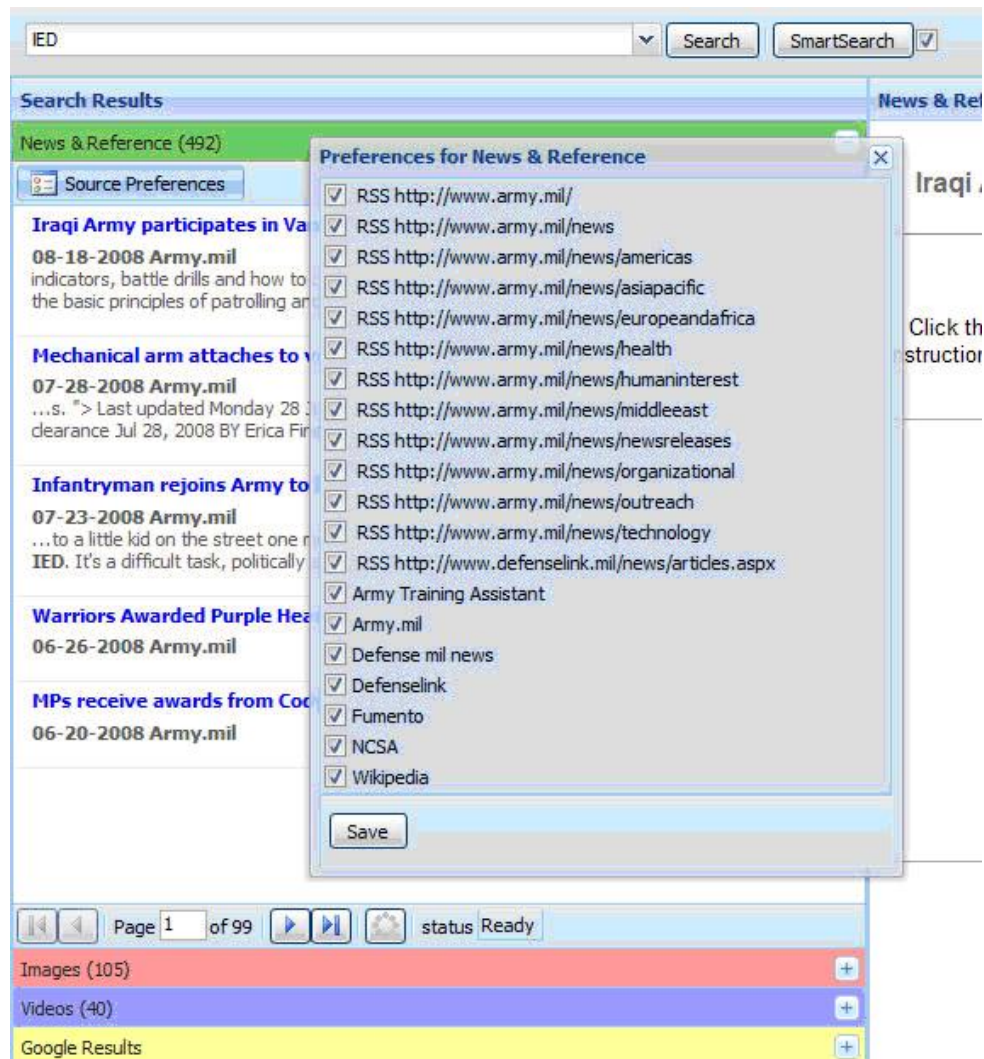
Figure 32. Search Source Filtering. The TA gives users the ability to filter the sources that are searched. In this example, a user has chosen to exclude local TA content from a search by un-checking the Army Training Assistant box in the filter window.

The Preview Panel. The preview panel allows users to preview a search result before deciding whether to include it in their training. For news and reference results, the preview panel will allow the user to open the web page in a new window. Within that window, users can copy any text they wish to use into a box at the top of that page. With the click of a button, that text will be copied to the preview panel for insertion into the training. For image results, the preview panel will show a small version of the image and will allow users to specify settings for the image before inserting it into their training (Figure 33).
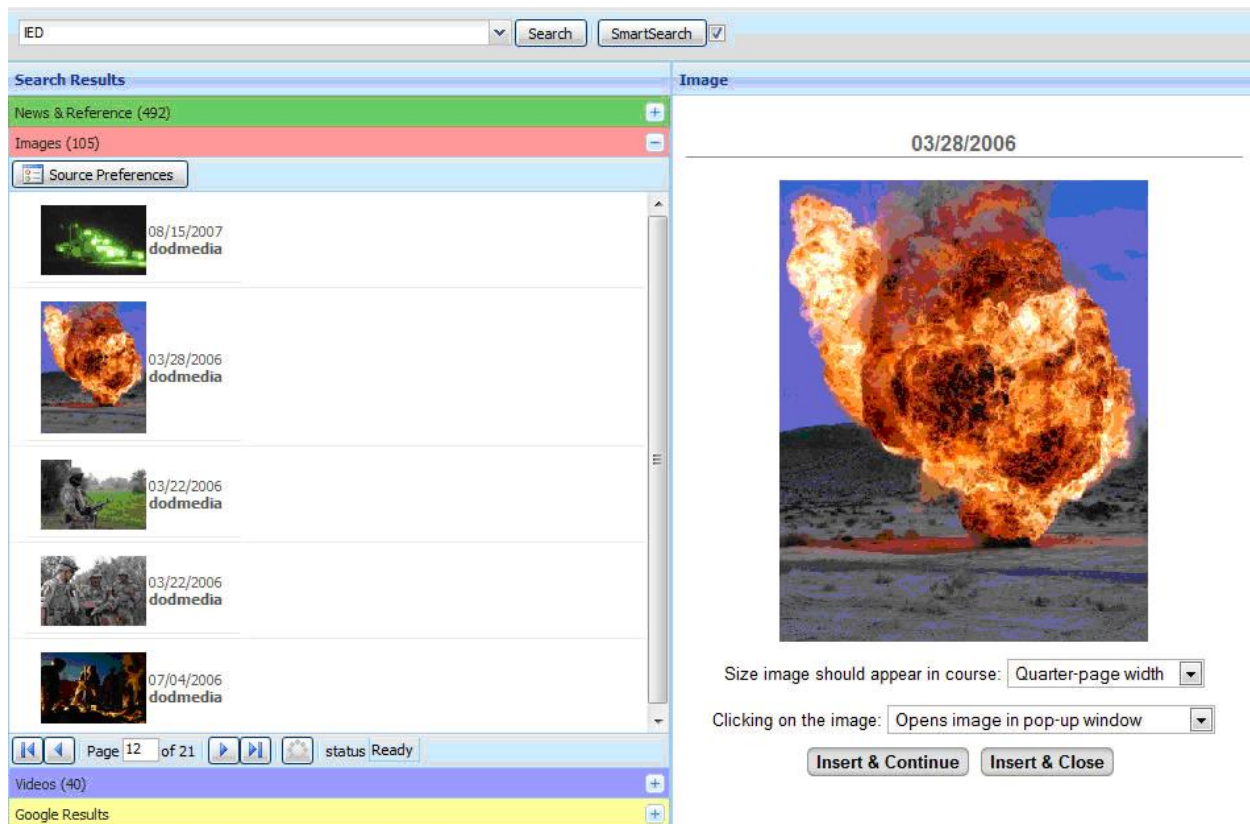
Figure 33. Search Image Preview. When conducting image searches, the preview panel will show a small version of the image and will allow users to specify settings for the image before inserting it into their training. In the example shown here, a user has chosen for a photo to be displayed at quarter-page width and to appear in a pop-up window when clicked.

Search Feature Design

The Phase I analysis of the Army training process combined with the Phase II behavioral research identified a need for the ability to search for up-to-date training artifacts and information on trends in the operational environment. This search capability would provide the end user the ability to:

- Search the TA to retrieve previously created training content;
- Search an internal TA database that maintained a collection of images, text, and other media assets that were explicitly placed in the TA database as "relevant" materials during the tool's development; and
- Search a database that was automatically created by an advanced web crawler that collects pages on the surface web meeting criteria specified by the needs analysis carried out in the Phase I/II behavioral research. The surface web is primarily the set of web pages that exist on the World Wide Web that can be retrieved without a password, and without typing a query into a form on a page. Surface web pages are written in Hypertext Markup Language (HTML) and are known as HTML pages. Google™ and other typical search engines index the content of static HTML pages and, when queried, provide a list of pages that meet the search criteria.

Specifically, the advanced web crawler would begin with a list of "seed" URLs provided by the Phase II behavioral research. The crawling system would examine each of those URLs to determine whether the current page should be included in the crawler's database. The system would then determine whether to include the page or not based on a set of search terms that were provided by the Phase II behavioral research. If the page under consideration met the criteria for inclusion in the database, it would be stored and indexed with the other included documents. The crawler would then follow the same procedure on each of the links on that document. If a page does not meet the criteria for inclusion, then it would not be saved and indexed. However, the crawler would examine any links on that page, up to four levels deep. That is, from any given page, the crawler would crawl each link on that page, then the links on each of those pages, and so on, to a level of four layers deep. If a page was determined to merit inclusion in the surface web database, the depth counter was reset at that point, thus enabling the crawler to continue crawling down that path until it no longer found relevant pages.

The searchable database of documents can be queried by an end user via the search interface in the TA. Communication between the TA and the surface web crawler is handled via Extensible Markup Language (XML) files. The XML allows for the efficient transfer of data in a format that can be read by many different applications, such as the TA. The search results are translated from XML to an easily readable format and are displayed in the TA user interface.

Meetings with project sponsors highlighted a need to be able to query "deep web" sites, as well as monitor news feeds and other "up-to-the-minute" sites in order to include those resources in addition to, and integrated with, the search results from the above mentioned sources. The deep web consists of those data sources that, while available on the World Wide Web, are not searched by typical search engines because the content of the deep web exists in databases, rather than as static HTML pages. When a user queries a deep web site, the system creates an HTML (or other document type) on the fly that the user can then view. An example of a deep web site is an airline reservation site. The airline reservation site has a database of flight times, prices, and other information. When users type their queries into the search box on the site, a database query is executed, and a customized page is created that contains the information the customer requested.

The Local TA Database Search

One of the most important capabilities of the TA is the ability to allow trainers to access and reuse existing training content created by other trainers. Therefore, when a trainer searches for content, the TA searches the local TA database in addition to the Web. There are two types of content for which the local database searches: text and images. Currently, there are not any videos stored in the local TA database.

Text. The local TA search returns complete pages of content. To rank the pages in order of potential relevance, the system first looks for the search term(s) in the text of all pages in the system. The resulting pages are then evaluated to determine whether they share the same background task and learning objective as the page from which the search was initiated. Those pages containing the search term(s) and the same task and LO are given the highest ranking, while those containing only the search term(s), but not the same task or LO are given the lowest

ranking. Pages containing the search term(s) and either the same task or LO are given an intermediate ranking.

Images. The local TA search also finds images stored within the TA database. Images in the TA image library, as well as images that have been uploaded by users and made searchable, possess "tags" that describe the images. Therefore, the local TA search first compares the search term(s) to the image tags. Images with tags that match the search term(s) are given the highest ranking. Next, images are pulled from pages that meet the text search criteria described above and ranked accordingly (i.e., images from pages with the highest text ranking are given the highest image ranking).

The Surface Web Search

The function of the surface web search is to create a corpus of documents that are related to a wide array of military training tasks. The primary goal of this portion of the search capability is to have a large resource of relevant documents on hand from which instructors can draw. Results from the surface web search only fall into the news and reference category.

In order to create the surface web crawler, the team chose between four basic sources of technology:

1. A commercial application,
2. Open source software,
3. Extant software from the National Center for Supercomputing Applications (NCSA) that was built to provide this capability for other projects, and
4. A tool developed specifically for this project.

After evaluating several commercial applications and assessing the requirements for this project against the capabilities of the extant NCSA software, commercial applications, and open source applications, we chose to utilize open source software for this portion of the search capability. Specifically, we chose to utilize Nutch (http://lucene.apache.org/nutch/). Nutch provides the capabilities that are required for the project, is available for both Windows and Linux platforms, and enabled us to implement the surface web search quickly. The Nutch software allowed us to implement our own ranking scheme for results from the surface web crawl. The algorithm we employed was term frequency-inverse document frequency (TF-IDF).

The TF-IDF is a weight that is important in document ranking schemes in the areas of Information Retrieval and Text Mining. Term-frequency (TF) refers to the number of times one term appears in one document. Inverse document frequency (IDF) is a measure of the importance of one term within the corpus of documents. The TF-IDF weight is determined by comparing the number of times a word appears in a specific document to the number of times the word appears in the entire collection of documents. It is often desirable to use normalization techniques with the weights. Common sense tells us that if a term appears in every document of a corpus, that term's importance would be less (e.g., "is," "to," "that," etc.) than terms that occur in only a few documents. Hence, the TF-IDF weight gives more importance to terms that appear in only a few documents. If a term appears multiple times in a few documents, those documents are given

higher rankings than those with less occurrences of that term. TF-IDF has been widely applied in search engine scoring and ranking.

The TA surface web crawling system ranks relevant documents for each search query using a scalar score (Salton & Buckley, 1988) computed via

$$score(q,d) \equiv coord(q,d) \cdot qNorm(q) \cdot \sum_{t \in q} \sum_{f \in d} \left[tf(t,f,d) \cdot idf(t)^2 \cdot boost_f \cdot fNorm(f,d) \right] \text{ (E.1)}$$

where the query, q, is a set of terms, t; the document, d, is a set of fields, f; *coord(q,d)* is representative of the number of query terms appearing in the document; *qNorm(q)* is a normalization factor that ensures that the score is independent of query length; *tf(t,f,d)* is the frequency of term t in field f; *idf(t)* is the inverse frequency of term t in the corpus of documents; *boost_f* is a factor representing the relative importance of field f (e.g., $boost_{URL} = 4$ and $boost_{anchor} = 2$); and *fNorm(f,d)* is a normalization factor that ensures the score is independent of document length.

Additionally, those results that come from a .mil domain are flagged in order to maintain their place in the search result ordering according to relevancy, but also to allow them to be easily identified in the event the searcher prefers to filter results to display only those results from a military domain.

Once this surface web search capability was in place, resources were diverted to the deep web capabilities that were not in the original project specification, but were identified as important capabilities during subsequent meetings with project stakeholders.

The Deep Web Search

A deep web crawler can be used to extract content from the web that is hidden behind database forms where traditional web crawlers cannot reach without enumerating all possible inputs. Much of the media content, specifically images, we wanted to include in the TA search is found in the deep web. Traditional web crawling for media is not always fruitful, as some videos and images do not have descriptions. Even if descriptions are provided, it is difficult to associate the description with a particular image if there are multiple images on a page. However, many images are housed on web sites that have their own custom search features. On these sites, the image data is often stored in a database, along with image tags that allow the site's search feature to accurately find an image.

To leverage each web site's custom, built-in search feature, we used a data extraction tool called AgentIDE. AgentIDE is a browser-based development environment that can create a wrapper around a web site, called an agent, which can be programmed to fill in web forms and simulate mouse clicks to navigate around the site. AgentIDE was developed by Cazoodle, Inc., a company which focuses on data extraction and integration to create interesting vertical applications (e.g., an apartment search) by compiling data from various sources. An individual with average computer knowledge can create agents within a short time frame, eliminating the need for hiring skilled programmers or writing custom parsers.

The technique used for extraction is intuitive to people familiar with web browsers. A user can use a mouse to point and click on the visual elements on the web page and provide a meaningful example for AgentIDE to infer other records. For example a user selects a title, description, and date for one record and the system infers other related records, marked in green and red for distinction (Figure 34). AgentIDE understands the visual relationships between entities on the page (e.g., date, title, and snippets of news) and can accurately associate them together. If the auto-generated visual relationships contain errors, a manual correction can be specified by the user.

Figure 34. AgentIDE Visual Data Extraction. AgentIDE understands the visual relationships between entities on the page (e.g., date, title, and snippets of news) and can accurately associate them together. In the example shown here, a user selects a title, description, and date for one record, and the system infers other related records, marked in green and red for distinction.

In addition to extracting information from a web page, an agent can navigate between pages. This navigation is visually represented by a state diagram, shown in the upper section of Figure 35. In this example, the state diagram points from an archived page to a listing page and shows that the agent will navigate from one to the other by clicking a link. The link is a user-defined element from the web page (e.g., a next button) that will facilitate the state transition. State transition can mean a transition from page to page, or a transition between different sections within a page. With both a navigational component and an extraction component, AgentIDE provides the flexibility to extract any type of data on the Web.

There are two types of agents used for crawling. The first type of agent is a periodic crawler that extracts archived content from news, image, and video sites. Depending on the type of content being crawled, different pieces of information are extracted. For news and references, the title, description, date, and full content of the article are extracted and saved. For images, the image uniform resource locator (URL), the image thumbnail URL, the title, description, and date are extracted. For videos, the title, URL, and video time are extracted. All extracted information is stored in a separate table in the MySQL database with a predefined schema. The agents are built with this schema in mind so they can be seamlessly integrated into the system.

The second type of agent is an "on-the-fly" agent that helps the user submit a query to a site and extract its content. This extraction happens in real-time and can give users a quick response. The on-the-fly agents use the same data schema as the periodic crawler and there is virtually no difference between the two, besides the amount of content extracted and how the execution is triggered. When a user submits a search, the TA passes the user-entered search term(s) to the on-the-fly agents. Each agent is tailored to a specific web site and uses the search term(s) to dynamically query the site using the site's built-in search engine. The agents then extract content from the search results page generated on each site and pass that information back to the TA. In Figure 35, the agent is built for the Wikipedia web site to extract content by issuing a search query. The agent has issued the query, "Iraq IED," and has returned a set of results from which the desired pieces of data will be extracted.

Execution Engine. To support multiple agents in parallel, we developed a distributed job dispatching system that can scale to hundreds of machines. The user queries will trigger the job dispatching system to distribute the jobs and gather results. The extracted content is inserted into a MySQL database so that it can be indexed and immediately available for search queries. In addition to running agents, the execution engine supports data retrieval from web services. For example, results from the TA database and surface web crawler are delivered to the execution engine via web services. The results are then integrated with the results from the agents.

In summary, the search feature facilitates the retrieval of related training content and resources, allowing the user to focus on creating the training. The next section presents the method by which testing and evaluation of the Army TA alpha release was conducted. The results of this evaluation are summarized along with their implications for future research and development objectives.
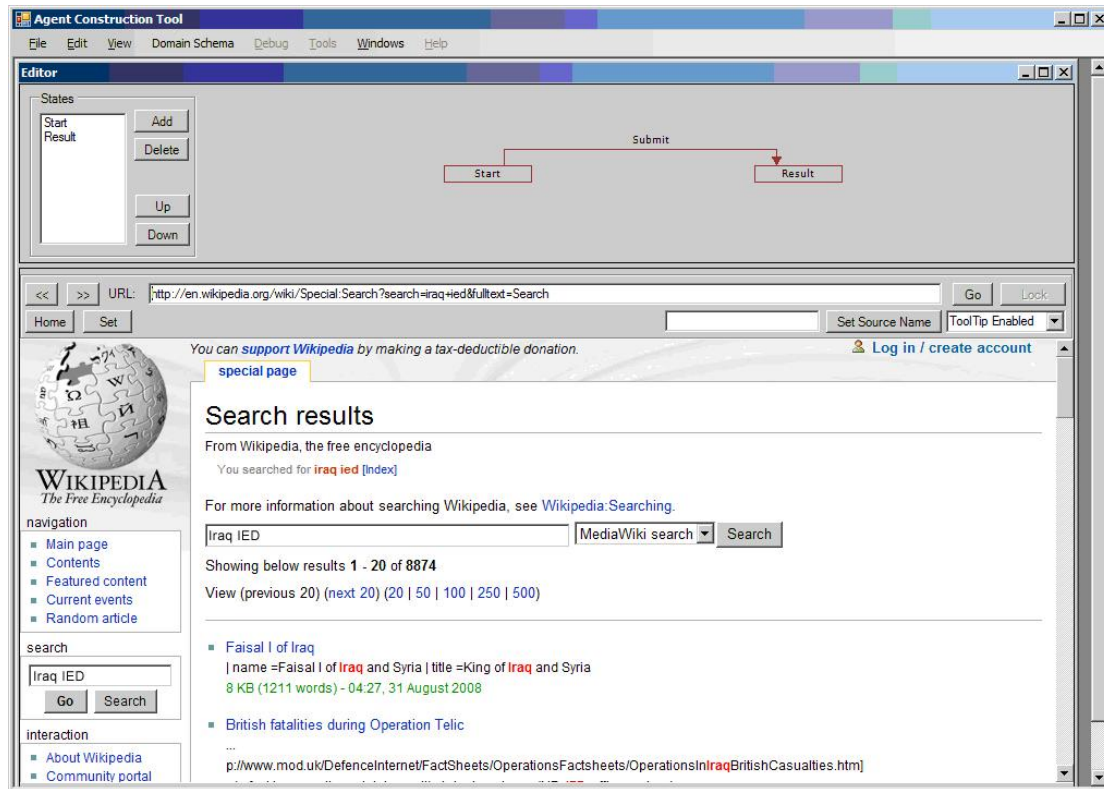
Figure 35. Search Agent for Wikipedia. When a user submits a search, the TA passes the user-entered search terms to on-the-fly agents. Each agent is tailored to a specific web site and uses the search terms to dynamically query the site using the site's built-in search engine. The agents then extract content from the search results page generated on each site and pass that information back to the TA. In this example, the agent was built for the Wikipedia web site to extract content by issuing a search query. The agent has issued the query, "Iraq IED," and has returned a set of results from which the desired pieces of data will be extracted.

Phase II Findings

Method

Participants

Thirty-nine Soldiers participated in alpha testing: 11 non-commissioned officers (10 sergeants and 1 master sergeant) and 28 commissioned officers (7 lieutenants, 15 captains, 5 majors, and 1 lieutenant colonel). All but three of the participants had deployment experience, with 79% ($N = 31$) having had multiple deployments. Sixteen (41%) participants held current duty positions in branches representative of the TA target audience (i.e., infantry, armor, cavalry). Sixteen participants tested the Map Overlay template, eleven participants tested the Test Question template, and ten tested the Self-Evaluation template. Two participants partially tested the Map Overlay template.

Procedure

TA alpha testing took place during two troop support ("umbrella") weeks, one held at Fort Hood, TX ($N = 18$) and one at Fort Carson, CO ($N = 21$). In both sessions, the templates tested were Test Question, Self-Evaluation, and Map Overlay. The protocols for the two test sessions differed slightly due to the scheduled availability of test participants.

Sessions at Fort Hood were approximately 2 hours long and consisted of a demographic survey (Appendix D), followed by a short demonstration of the TA capabilities, and then limited, guided user testing of the TA *authoring* functions (the training generation testing protocol is shown in Appendix E). After completing user testing, participants filled out a user impressions survey (Appendix F) and participated in a focus group (protocol shown in Appendix G).

Sessions at Fort Carson lasted approximately 4 hours and also included a demographic survey, user testing of the TA, a follow-up impressions survey, and a focus group. At Fort Carson, however, test participants also completed a training module as a trainee (usability testing protocol is shown in Appendix H). Additionally, participants conducted more in-depth testing of the authoring functions (Appendix I).

Results

General User Impressions

Detailed User Impressions Survey results are shown in Appendix J. Those results indicated that test participants generally found the Army TA to be easy to use (46-86%, depending on the feature assessed) with the majority reporting that they could and would use it (75% and 66% respectively). Concerns about time constraints and computer access, particularly at the small unit level, led testers to recommend schoolhouse applications for the tool. Other barriers to adoption that testers listed included limited access to classified content and the quality of generic base content. Some test participants suggested that the tool be used to rapidly generate training that *does not* change frequently because taking the time even to modify existing training would not be feasible. Another suggestion was that the tool would be helpful for providing training to people who have changed branch and need to get up to speed on new tactics, techniques, and procedures (TTP). Test participants seemed to agree that the tool would be best for lower-level leader training.

Technical Issues Identified

Consistent with the purpose of alpha testing, users also identified a number of technical issues with the TA that represented the normal glitches in the development process of complex technologies. Issues ranged from features not displaying properly on the page, to images not saving to the database, to code that needed to be optimized for multiple simultaneous users. With such a complex system, and so many possible ways to accomplish the same task, the alpha testing played a crucial role in identifying these issues.

Training Content Issues Identified

Because the Fort Hood sample had a relatively low proportion of test participants from the intended target audience [i.e., 11% (2/18) in the combat arms], content quality was explicitly analyzed only by the Fort Carson sample. Some knowledgeable testers at Fort Hood made comments about content, however. Probably the most important observation was that if the content is not considered effective, the tool will not be perceived as useful, no matter how easy it is to use. Users would have to change too much in order to create training, which would lead them to fall back on current alternatives.

This observation appeared to be born out by the Fort Carson visit, which had a larger number of target audience members and involved the construction of actual courses. In general, Fort Carson testers indicated that the generic content as currently developed was inadequate. They perceived it to be too basic, too "civilian," too rigid (rote memorization, text-based instead of scenario-based and interactive), and not relevant to or best suited for emerging training requirements. Participants indicated some skepticism that the tool would be able to do better providing up-to-date content than other Army resources like the Center for Army Lessons Learned. The matter of producing classified versus unclassified training came up as an issue for Fort Carson test participants, who generally reported that unclassified content was too general to be useful for unit training.

Usability Issues Identified

My Training Page and Common Training Pages. Test participants generally found the My Training page very simple to use. The only common issue observed was that participants did not seem to grasp the distinction between "Training I'm Taking" and "Training I've Authored." This issue may have arisen because test participants relied on experimenters more so than exploration to figure out the interface. Among the common training pages, some users confused the Introduction page with other components of the training (e.g., Introduction, Basic Tutorial, etc.). One user recommended using a word other than "Introduction" once users are no longer on the introduction page.

Basic Page (Editing Text). Once reaching the text editor, testers (80%) found it simple to modify generic content text. Difficulties arose getting the page into Edit mode and figuring out how to bring up the text editor once in Edit mode. Test participants had to look around for some time before finding the Edit button in the upper right toolbar. They did not seem to fully understand the difference between Preview Mode and Edit Mode. Once in Edit mode, most users had trouble figuring out how to bring up the text editor. When they saw the gray box, they did not know that they had to click on it or the edit icon in order to start making changes. The explanatory "tool-tip" only came up after the mouse had been still for a relatively long period of time.

Some users had difficulty figuring out how to add a hotlink to the text. It may be the case that they found it difficult to imagine how a link would be used in an actual training product, and it was not obvious that text had to be highlighted in order to make it a link. Once this was explained, users typed in text and generally figured out how to activate it as a link. There was

occasional confusion between adding hyperlinked text and adding a URL to underlie the text. Users had trouble with closing the add link box because they were unsure whether their entries would be saved. This confusion arose because the method for closing the add link box (an "x" in the upper right corner) is the typical convention for closing an application. Closing applications does not automatically save changes, but closing the add link box does.

Basic Page (Editing Images). Test participants (86%) found editing image properties quite simple, once they got into the image edit mode. Users had difficulty, however, figuring out how to get into image edit mode. Under uncertain conditions, users tried to edit the image by (1) clicking on the image; (2) right-clicking on the image; or (3) clicking on the Internet Explorer (IE) icons that appear when an image is moused over (e.g., save, open My Images, etc.).

Search Capability. Test participants (65%) generally found the search capability easy to use. The search capability was slow, however, and many of the results were not relevant to the training topic at hand or quite some time out of date. When in the search mode, users found it somewhat unintuitive to open and close panels (and determine whether a panel was open or closed). Users did not find retrieving news articles to be very helpful for creating training. Instead they wanted restricted or classified content, such as TTP.

Editing the Self-Evaluation and Test Question Templates. Test participants found both the Self-Evaluation template and the Test Question template easy to use. One common problem encountered was that users expected to be able to save each component of the question individually (rather than having to scroll to the bottom to save the entire question). Users of the test question template did have some difficulty understanding the different feedback types. Testers who talked about feedback type indicated that they would not give feedback independently of student answers.

Editing Map Overlay Template. Editing the map overlay template was a little more difficult (46% rated it easy to use). When editing the overlay template, testers had the same issues as testers of the other templates with regard to saving individual components. They wanted to be able to do this instead of having to scroll down to the bottom of the page and save the whole question. In general, test participants seemed a little confused about base overlays versus the answer overlay. They did not seem to understand what they were working on – question content or answer key. There were also a number of usability issues identified with the map drawing tool itself, as testers found that some features did not behave in the way that they expected. However, once these features were explained, most testers had no difficulty using the tool.

Discussion

Test participants were supportive of the TA concept and provided numerous constructive comments on how to enhance the usability and applicability of the tool. The key implications of their input for future development can be summarized as follows:

1. The TA generally is easy to use, but it represents something new to learn so the degree to which the tool advances the training development process will be key to adoption.

2. Training content generated by the TA will be most relevant to the operational environment if it is classified. This information is the most up to date and the most important to deployed and pre-deployed trainees.
3. Limited access to classified computers makes it infeasible to deliver large-scale classified training with the TA.
4. The best application environment for the TA if classified content cannot be used is the schoolhouse, particularly for cadets and junior enlisted personnel and/or officers, for providing standardized training that does not change frequently, for supporting hands-on training with "crawl-phase" procedural instruction, and as self-development training following branch changes (e.g., armor to infantry).
5. The quality of generic content and search findings will be critical to the adoption of the tool. Trainers have limited time to create training and will fall back on current alternatives unless the TA can be used very quickly and easily.

Conclusions and Recommendations for Future Research

Next Steps Based on Alpha Testing Results

Generic Base Content Development

Alpha testing participants listed quality generic base content as one of the most important features of the tool. The creation of accurate, relevant content will require the extensive support of Army subject matter experts (SMEs). The SMEs must have a solid understanding of Army doctrine, an in-depth knowledge of current enemy tactics, techniques, and procedures, and recent deployment experience. Ideally, they have themselves been a unit trainer so they can represent the needs of the TA target audience. The base content development process should include identification of the subset of doctrinal tasks and learning objectives for which base content will be written, collaboration between a SME and an instructional designer to create the base content for each identified task and LO, and review of the content by target users of the TA.

Search Feature Additions

Alpha testers also indicated that the search results must be improved in order for the search to be useful. Improvements should be made by expanding the search beyond the public Internet. Examples of additional sites and databases that should be searched include the Center for Army Lessons Learned, Army Training and Evaluation Program (ARTEP) manuals, databases of post-specific maps, and classified sites containing the latest friendly and enemy TTPs. While access to classified information to incorporate into training was identified as one of the most important feature additions during the alpha testing, it is also the most problematic. Once training incorporates classified information, it becomes classified itself. This means that the TA would need to be able to restrict access to training modules containing classified information. Another potential issue with searching classified sites is simply getting access and permission to search them. Finally, Internet crawl results currently are cached and pieces are stored in the TA database. This might need to change if the results include classified information. In summary, a thorough study should be done to determine the feasibility and implications of searching the classified Internet.

Course and Activity Template Enhancements

Alpha testing of the current TA revealed a number of usability enhancements that should be made to many of the activity templates. For example, testers suggested combining the control measures and military symbols tools in the overlay creation template into a single, more flexible tool. Additionally, only three of the six activity templates identified by the Phase II research have been created. The three additional templates (e.g., situational judgment, synchronous collaboration, and location selection) should be created and incorporated into the tool. Overall course content templates should also be made more flexible and customizable to a trainer's needs. Specifically, users should be able to rearrange pages, insert pages, and change the types of content found on a page from the default types to a custom combination.

Access to the Tool

Access to the tool was also a concern identified in the alpha testing. While access to computers cannot be controlled, access to the TA can be ensured to any Soldier that has a computer with Army network access by uploading it to an Army network. In addition to providing broad access to the tool, this would allow trainers to begin using it and adding to the library of base content. Each new training module created will make the tool a richer and more valuable resource for generating subsequent training. Finally, access to classified content may be more feasible if the TA is hosting on an Army network. Additionally, future efforts will work towards developing a Sharable Content Object Reference Model (SCORM) compliant system and link the system to an Army approved learning management system to further enhance access to the tool and training materials.

Summary

Further research and development will help provide the base content that is crucial to improving the speed with which training can be generated, will ensure that all relevant resources are easily searched and accessed, will make the tool more flexible and customizable to a trainer's needs, and will ensure that the tool is accessible by anyone who can connect to an Army network. With these enhancements, the TA will allow Army trainers to leverage the knowledge and experience of other trainers to quickly create customized, instructionally sound training that meets their needs.

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Appendix A

List of Acronyms

AAR	After Action Review
AC	Active Component
AIT	Advanced Individual Training
AKO	Army Knowledge Online
AO	Area of Operations
ARFORGEN	Army Force Generation
ARTEP	Army Training and Evaluation Program
BCKS	Battle Command Knowledge System
BNCOC	Basic Non-Commissioned Officers' Course
CAC	Common Access Card
CALL	Center for Army Lessons Learned
CARL	Combined Arms Research Library
CBT	Computer Based Training
CO CDR	Company Commander
CPX	Command Post Exercise
CTC	Combat Training Center
DA	Department of the Army
Dbase	Database
DMX	Decision-Making Exercise
DTF	Digital Training Facility
EPW	Enemy Prisoner of War
FBCB2	Force XXI Battle Command, Brigade-and-Below
FM	Field Manual
FOUO	For Official Use Only
FRAGO	Fragmentary Orders
HQ	Headquarters
HSOC	Home Station Operations Center
HTML	Hypertext Markup Language
IDF	Inverse Document Frequency
IE	Internet Explorer
IED	Improvised Explosive Device
JRTC	Joint Readiness Training Center
LFX	Live Fire Exercise

LMS	Learning Management System
LO	Learning Objective
MAPEX	Map Exercise
MDMP	Military Decision-Making Process
METL	Mission Essential Task List
METT-TC	Mission, Enemy, Terrain and Weather, Troops and Support, Time Available, Civil Considerations
MSTF	Mission Support Training Facility
MOS	Military Operational Specialty
MS SQL	Microsoft Structured Query Language
NCO	Non-Commissioned Officer
NCSA	National Center for Supercomputing Applications
OBC	Officer's Basic Course
OIF	Operation Iraqi Freedom
OPORD	Operations Order
PL	Platoon Leader
PLDC	Platoon Leader's Development Course
RC	Reserve Component
RDL	Reimer Digital Library
ROE	Rules of Engagement
ROI	Rules of Interaction
RSOI	Reception, Staging, Onward Movement, and Integration
SCORM	Sharable Content Object Reference Model
SGT	Sergeant
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SQL	Structured Query Language
STTR	Small Business Technology Transfer
STX	Situational Training Exercise
TA	Training Assistant
TASS BN	Total Army School System Battalion
TEWT	Training/Tactical Exercise without Troops
TF	Term Frequency
TF-IDF	Term Frequency – Inverse Document Frequency
TLAC	Think Like a Commander
TTP	Tactics, Techniques, and Procedures
URL	Uniform Resource Locator

WLC	Warrior Leaders' Course
XML	Extensible Markup Language

Appendix B

Background Tasks and Their Associated Learning Objectives

Task: Route Reconnaissance (or Reconnaissance Patrol)
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Select mounted or dismounted reconnaissance based on METT-TC
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Identify safe routes for tactical movement
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Establish radio communications – Locate radio stations
Take action on contact – Make new COA recommendation
Interact with local nationals
Work with interpreters
React to a civil disturbance
React to ambush – Locate threat forces
React to snipers – Identify sniper positions
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Prepare a post-reconnaissance overlay
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Observation Post Operations
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Identify safe routes for tactical movement
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Determine appropriate manning level for continuous operation
Plan a mission – Identify special mission requirements
Plan a mission – Plan for continuous or redundant communications
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Plan fighting/battle positions
Adjust a plan based on new intelligence
Construct an observation post
ROE/ROI application
Establish radio communications – Locate radio stations
React to ambush – Locate threat forces
React to snipers – Identify sniper positions
Assume a leadership role
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Report tactical information
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Reconnoiter a Built-up Area or Urban Reconnaissance
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Select mounted or dismounted reconnaissance based on METT-TC
Plan a mission – Organize unit as necessary to accomplish mission
Identify safe routes for tactical movement
Plan a mission – Coordinate with adjacent units
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify enemy safe havens
Plan a mission – Identify hazardous and/or danger areas
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Establish radio communications – Locate radio stations
React to ambush – Locate threat forces
React to snipers – Identify sniper positions
Take action on contact – Make new COA recommendation
Assume a leadership role
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Interact with local nationals
Work with interpreters
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Prepare a post-reconnaissance overlay
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Building Assault
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Identify major and/or key terrain features
Identify safe routes for tactical movement
Plan a mission – Coordinate with adjacent units
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Establish radio communications – Locate radio stations
Take action on contact – Make new COA recommendation
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
Secure uncooperative civilians during operations
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Manage unintended consequences
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Presence Patrol
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Identify special mission requirements
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify hazardous and/or danger areas
Plan a mission – Coordinate with higher (resources or procedures)
Plan a mission – Plan for unit security
Plan a mission – Obtain information about persons to be apprehended
Plan a mission – Select tactical movement techniques and formation options
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Coordinate with reserve force
Interact with local nationals
Work with interpreters
React to a civil disturbance
React to ambush – Locate threat forces
React to snipers – Identify sniper positions
Take action on contact – Make new COA recommendation
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
Secure uncooperative civilians during operations
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Conduct a Raid or Combat Patrol
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Identify safe routes for tactical movement
Assign positions for raid elements
Plan a mission – Coordinate with adjacent units
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify major and/or key terrain features
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Set the conditions for a raid
Establish radio communications – Locate radio stations
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Manage unintended consequences
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Security Patrol
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Identify special mission requirements
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify hazardous and/or danger areas
Plan a mission – Plan for unit security
Plan a mission – Assign additional tasks as required to conduct the mission
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
React to a civil disturbance
React to ambush – Locate threat forces
React to snipers – Identify sniper positions
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Manage unintended consequences
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Convoy Escort
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify hazardous and/or danger areas
Plan a mission – Coordinate with higher (resources or procedures)
Plan a mission – Determine location of unit in relation to convoy
Plan a mission – Determine actions at halts
Plan a mission – Determine actions in case of vehicle breakdown
Plan a mission – Determine actions in built-up areas
Plan a mission – Determine riot control procedures
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Establish radio communications – Locate radio stations
Adjust a plan based on new intelligence
Make recommendations for dealing with obstacles
Take action on contact – Make new COA recommendation
React to a civil disturbance
React to ambush – Locate threat forces
React to snipers – Identify sniper positions
Assume a leadership role
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Report tactical information
Manage unintended consequences
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Checkpoint/Traffic control point operations/Traffic Control Point Operations
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Coordinate with higher (resources or procedures)
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Construct a checkpoint/traffic control point
Plan fighting/battle positions
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Conduct a vehicle search with uncooperative civilians
Work with interpreters
Identify contraband or prohibited items
ROE/ROI application
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Secure uncooperative civilians during operations
Manage unintended consequences
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Building Search
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify major and/or key terrain features
Plan a mission – Coordinate with higher (resources or procedures)
Plan a mission – Plan contingencies for obstacles and danger areas
Plan a mission – Select method to control building occupants
Identify safe routes for tactical movement
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Establish radio communications – Locate radio stations
Work with interpreters
Take action on contact – Make new COA recommendation
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
Secure uncooperative civilians during operations
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Manage unintended consequences
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Route Security (or IED Patrol)
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify hazardous and/or danger areas
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Interact with local nationals
Adjust a plan based on new intelligence
Establish radio communications – Locate radio stations
Coordinate with reserve force
Take action on contact – Make new COA recommendation
React to ambush – Locate threat forces
React to snipers – Identify sniper positions
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Cordon and knock/Cordon and search
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify hazardous and/or danger areas
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Visualize, describe, and direct operations
Identify safe routes for tactical movement
Take action on contact – Make new COA recommendation
Interact with local nationals
Work with interpreters
React to snipers – Identify sniper positions
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Manage unintended consequences
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Conduct an Attack
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Identify major and/or key terrain features
Plan a mission – Coordinate with higher (resources or procedures)
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Identify safe routes for tactical movement
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Establish radio communications – Locate radio stations
Take action on contact – Make new COA recommendation
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Conduct a Defense

Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Develop an integrated obstacle plan
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Plan a mission – Develop disengagement criteria
Identify safe routes for tactical movement
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Plan fighting/battle positions
Take action on contact – Make new COA recommendation
Assume a leadership role
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Task: Movement to Contact
Plan a mission – Conduct a map reconnaissance/establish control measures
Plan a mission – Organize unit as necessary to accomplish mission
Plan a mission – Coordinate with adjacent units
Plan a mission – Plan for continuous or redundant communications
Plan a mission – Select a technique for conducting a movement to contact
Plan a mission – Coordinate with higher (resources or procedures)
Plan a mission – Address actions on contact with the enemy or belligerents
Plan the employment of fire support – Determine the purpose and effect of indirect fires
Plan the employment of fire support – Identify priority targets
Prepare for the employment of fire support – Prepare observation plan
Prepare for the employment of fire support – Prepare trigger lines
Visualize, describe, and direct operations
Maintain operations security – Protect friendly information
Adjust a plan based on new intelligence
Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment
Assume a leadership role
React to snipers – Identify sniper positions
React to ambush – Locate threat forces
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
Handle enemy prisoners of war (EPWs) – Safeguard EPWs
ROE/ROI application
Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information
Consolidate and reorganize
Rehearsal - Pre-combat check/Pre-combat inspection
Rehearsal - Confirmation brief
Rehearsal - Backbrief

Appendix C

General Training Need Categories and Their Associated Learning Objectives

Category: Visual Communications Skills
Learning objectives related to visual communications skills enhance trainees' ability to communicate mission plans or tactics using operational graphics; These skills are somewhat independent of digital display use, although they enhance such use because trainees will know what it is they wish to create with drawing tools, etc.
Plan a mission – Conduct a map reconnaissance/establish control measures Identify hazardous and/or danger areas Determine location of unit in relation to convoy Identify safe routes for tactical movement Prepare the employment of fire support – Prepare observation plan Prepare the employment of fire support – Prepare trigger lines React to ambush – Locate threat forces Prepare a post-reconnaissance overlay Take action on contact – Make new COA recommendation Adjust a plan based on new intelligence Assign positions for raid elements Plan a mission – Develop an integrated obstacle plan
Category: Coordination and Synchronization
Learning objectives related to coordination and synchronization enhance trainees' ability to consider the larger picture involved in mission planning and execution; That larger picture may include adjacent, supporting, higher, or reserve units and/or assets
Plan a mission – Conduct a map reconnaissance/establish control measures Plan a mission – Coordinate with adjacent units Plan a mission – Determine appropriate manning level for continuous operation Plan a mission – Plan for continuous or redundant communications Plan a mission – Coordinate with higher (resources or procedures) Plan a mission – Determine location of unit in relation to convoy Plan the employment of fire support – Determine the purpose and effect of indirect fires Prepare for the employment of fire support – Prepare observation plan Prepare for the employment of fire support – Prepare trigger lines Coordinate with adjacent elements Coordinate with reserve force Set the conditions for a raid Plan a mission – Develop an integrated obstacle plan Consolidate and reorganize
Category: Tactical Decision-making
Learning objectives related to tactical decision-making enhance trainees' ability to make tactically sound decisions regarding the organization and employment of troops and combat support
Plan a mission – Organize unit as necessary to accomplish mission Plan a mission – Select mounted or dismounted reconnaissance based on METT-TC Plan a mission – Determine appropriate manning level for continuous operation Plan a mission – Select method to control building occupants Plan a mission – Select tactical movement techniques and formation options Plan a mission – Select a technique for conducting a movement to contact Visualize, describe, and direct operations Plan the employment of fire support – Determine the purpose and effect of indirect fires

Plan a mission – Develop disengagement criteria
Take action on contact – Make new COA recommendation
Adjust a plan based on new intelligence
Make recommendations for dealing with obstacles
Conduct actions at danger areas – Select movement techniques
Assign positions for raid elements

Category: Rapid Reaction

Learning objectives related to rapid reaction enhance trainees' ability to respond automatically to certain combat events; Given the medium of the TA tasks (IMI), these learning objectives focus more on the perceptual skills that facilitate automatic responding, as opposed to the motor skills

React to ambush – Locate threat forces
React to snipers – Identify sniper positions

Category: Communications Skills

Learning objectives related to communications skills enhance trainees' ability to maintain radio and other connections throughout a mission; For actual units, exercises with these learning objectives also may facilitate internalization of these connections; The TA does not address buttonology skills for digital equipment, which is handled by very complex and expensive simulations

Plan a mission – Plan for continuous or redundant communications
Establish radio communications – Locate radio stations

Category: Tactical Perception

Learning objectives related to tactical perception enhance trainees' sensitivity to METT-TC (especially terrain) factors that influence mission planning and execution; IMI is especially well suited to enhancing tactical perception skills

Plan a mission – Identify enemy safe havens
Plan a mission – Identify hazardous and/or danger areas
Plan a mission – Identify major and/or key terrain features
Plan a mission – Obtain information about persons to be apprehended
Identify safe routes for tactical movement
Plan the employment of fire support – Identify priority targets

Category: Adaptive Thinking and Contingency Planning

Learning objectives related to adaptive thinking and contingency planning enhance trainees' ability to consider unexpected events that may come up during a mission; They also enhance trainees' flexibility of thinking in response to such events

Plan a mission – Identify special mission requirements
Plan a mission – Plan for unit security
Plan a mission – Assign additional tasks as required to conduct the mission
Plan a mission – Plan contingencies for obstacles and danger areas
Plan a mission – Determine actions at halts
Plan a mission – Determine actions in case of vehicle breakdown
Plan a mission – Determine actions in built-up areas
Plan a mission – Determine riot control procedures
Adjust a plan based on new intelligence
Assume a leadership role
Take action on contact – Make new COA recommendation

Category: Interpersonal Competency

Learning objectives related to interpersonal competency enhance trainees' ability to handle challenging situations involving other people, including superiors, subordinates, members of the sister services or host nation security forces, and host nation civilians; To some extent these learning objectives can address cultural awareness

Plan a mission – Address actions on contact with the enemy or belligerents
Plan a mission – Select method to control building occupants
Plan a mission – Determine riot control procedures
Maintain operations security – Protect friendly information
Handle enemy prisoners of war (EPWs) – Search EPWs
Handle enemy prisoners of war (EPWs) – Keep EPWs silent
React to civil disturbance
Secure uncooperative civilians during operations
Conduct a vehicle search with uncooperative civilians
Work with interpreters
Manage unintended consequences
Interact with local nationals

Category: Information Management

Learning objectives relating to information management enhance trainees' understanding of the information networks in a unit, who must know what and when; For actual units, these learning objectives may assist in internalizing such networks

Process captured documents and equipment – Tag all captured documents and equipment
Process captured documents and equipment – Evacuate captured documents
Report tactical information

Category: Procedural Skills

Learning objectives related to procedural skills may vary widely, but have in common their impact on trainee's ability to follow fairly straightforward procedures; The procedures addressed by these learning objectives do not include operational procedures (e.g., equipment and vehicles), although they could

Construct an observation post
Construct a checkpoint/traffic control point
Plan fighting/battle positions
Identify contraband or prohibited items

Category: Medical Skills

Learning objectives related to medical skills enhance trainees' perceptual speed as it relates to medical treatment; These "walk-phase" objectives are meant to improve the speed with which medical personnel make judgments although motor medical skills are not addressed

Treat and evacuate casualties – Perform medical treatment
Treat and evacuate casualties – Support medical treatment

Category: ROE/ROI application

The ROE/ROI learning objective enhances trainees' ability to apply rules of engagement/interaction to making tough combat decisions

Same as category

Appendix D

Demographic Survey Questions

1. Current Rank: _____

2. Current Duty position: _____

3. Unit type (e.g., armor, cavalry, engineer): _____

4. Recent deployment experience:

Dates	Location	Duty Position

5. Please describe your experience providing training for subordinates in your current and/or past unit(s).

Reason for Training (circle all that apply)	Teaching Methods (circle all that apply)	Subject Taught (e.g., gunnery) (please specify)
- Pre-deployment - CTC rotation - Post-deployment - Refresher/Sustainment - New personnel - New equipment - Other (please specify):	- Briefing/lecture - Computer-based training - Range training - Small-group instruction - Other (please specify):	
- Pre-deployment - CTC rotation - Post-deployment - Refresher/Sustainment - New personnel - New equipment - Other (please specify):	- Briefing/lecture - Computer-based training - Range training - Small-group instruction - Other (please specify):	
- Pre-deployment - CTC rotation - Post-deployment - Refresher/Sustainment - New personnel - New equipment - Other (please specify):	- Briefing/lecture - Computer-based training - Range training - Small-group instruction - Other (please specify):	
- Pre-deployment - CTC rotation - Post-deployment - Refresher/Sustainment - New personnel - New equipment - Other (please specify):	- Briefing/lecture - Computer-based training - Range training - Small-group instruction - Other (please specify):	

6. Please indicate which, if any, of the challenges listed below that you have experienced when providing training for subordinates in your current and/or past unit(s). Circle all that apply.

- o Technology limitations (e.g., available technology wasn't usable or didn't work)
- o Personnel constraints (e.g., no one available to conduct performance assessment)
- o Resource limitations (e.g., not enough computers, not enough ammunition)
- o Time constraints
- o Difficulty determining what to train
- o Difficulty determining how to train
- o Other:

7. Please list the strategies you used to overcome these challenges:

_____

_____

_____

Appendix E

Fort Hood Training Generation Protocol

OPTION #1
1. Be sure IE is set to allow pop-ups
2. Login to the Army TA using your username and password
3. Select "Create New Training"
4. Select "Develop Training for a Doctrinal Task"
5. Select "Route Security (or IED Patrol)"
6. Select "Plan a Mission – Conduct a Map Reconnaissance"
7. Rename Training to "(Your Last Name) Route Security Training"
8. Select renamed training
9. Edit the Introduction text
   a. Add a hyperlink to the page
10. Edit a page in the Basic Tutorial by replacing an image with either the "map.jpg" image on your desktop or an image found via the search (if available).
    a. Add a caption to the image
11. Edit a page in the Basic Tutorial by changing the size of a photo
12. Edit the Practical Exercise Map Overlay Creation Page as follows:
    a. Insert a map by selecting the designated image from the desktop
    b. Edit the "base" overlay that students will see as they begin the practical exercise. When completed. Lock the overlay layers that you do not want students to edit.
    c. Edit the "correct answer" map overlay using the drawing tool
13. Make or suggest content edits as they are noticed
14. Copy completed training
15. Delete training copy

OPTION #2
1. Be sure IE is set to allow pop-ups
2. Login to the Army TA using your username and password
3. Select "Create New Training"
4. Select "Develop Training for a Doctrinal Task"
5. Select "Route Security (or IED Patrol)"
6. Select "Plan a Mission – Coordinate with Adjacent Units"
7. Rename Training to "(Your Last Name) Route Security Training"
8. Select renamed training
9. Edit the Introduction text
   a. Add a hyperlink to the page
10. Edit a page in the Basic Tutorial by replacing an image with either the "map.jpg" image on your desktop or an image found via the search (if available).
    a. Add a caption to the image
11. Edit a page in the Basic Tutorial by changing the size of a photo
12. In the Practical Exercise, edit the Self-Evaluation Question feedback.
13. Make or suggest content edits as they are noticed

14. Copy completed training
15. Delete training copy

OPTION #3
1. Be sure IE is set to allow pop-ups
2. Login to the Army TA using your username and password
3. Select "Create New Training"
4. Select "Develop Training for a Doctrinal Task"
5. Select "Building Assault"
6. Select "Plan a Mission - Determine the purpose and effect of indirect fires"
7. Rename Training to "(Your Last Name) Building Assault Training"
8. Select renamed training
9. Edit the Introduction text
    a. Add a hyperlink to the page
10. Edit a page in the Basic Tutorial by replacing an image with either the "map.jpg" image on your desktop or an image found via the search (if available).
    a. Add a caption to the image
11. Edit a page in the Basic Tutorial by changing the size of a photo
12. Edit the Practical Exercise by modifying the question and response options for Question 1
13. Make or suggest content edits as they are noticed
14. Copy completed training
15. Delete training copy

Appendix F

User Impressions Survey

Usability (check the box to indicate your answer)

	Very Easy	Easy	Neither	Difficult	Very Difficult
1. How easy was it to take an Army TA training package?					
2. How easy was it to construct a training package using the Army TA?					
3. How easy was it to edit text?					
4. How easy was it to use the search function?					
5. How easy was it to insert images?					
6. How easy was it to use the drawing tool (if applicable)?					

Please list any Army TA features that posed difficulty.

Utility

1. How useful do you think the Army TA will be for conducting unit training (circle one)?

Definitely   Probably   Maybe   Probably Not   Definitely Not

Please list the reasons why/why not.

2. *Could* you use the Army TA to create the kind of training your unit needs (circle one)?

Yes   No

Please specify why/why not.

3. *Would* you use the Army TA to create unit training (circle one)?

Yes   No

Please list the challenges to using the Army TA for conducting unit training.

Please list the feasible alternatives to using the Army TA for conducting unit training.

Effectiveness
How effective do you think the training generated by the Army TA can be for addressing key training requirements in your unit (circle one)?

Very Effective   Somewhat Effective   Neither   Somewhat Ineffective   Very Ineffective

Please list the training requirements you think the Army TA training could address effectively.

General

1. What did you particularly *like* about the Army TA?

2. What did you particularly *dislike* about the Army TA?

3. What recommendations do you have for improving the Army TA (please list)?

Appendix G

Focus Group Interview Protocol

In the focus groups, participants will be walked through the screen shot booklets and asked to describe their experiences with the interface features and system capabilities represented. Emphasis will be placed on the areas of observed difficulty during the testing sessions.

For training <u>completion</u>, participants will be asked about (screen captures designated in italics):

- Introduction
- Basic Tutorial (general) *(screen capture of first page)*
- Basic Tutorial (learning objective) *(screen capture of first page)*
- What Right Looks Like *(screen capture of scenario page and solution page)*
- Practical Exercise (template below depends on what training module was taken)
    - Map Overlay Creation *(screen capture of question page)*
    - Free-text *(screen capture of question page)*
    - Test Question *(screen capture of question page)*
    - Answer/Feedback *(screen capture for each type of template)*

Questions will focus on layout, reading load, subject matter accuracy (as generic content), usability of overlay tool, utility of feedback (as generic content)

For training <u>construction</u>, participants will be asked about (all items should have a screen capture, which is designated in italics):

- Editing text *(screen capture of edit intro page after edit has been selected and the same page after the text editor is showing)*
- Using the search functionality *(screen capture of initial search results page)*
- Inserting images *(screen capture of image results page with an image selected)*
- Edit practical exercise questions:
    - Using the map overlay drawing tool *(screen capture of the drawing tool in edit mode)*
    - Editing test question text *(screen capture of the edit test question page)*
    - Editing self-evaluation text *(screen capture of the edit test question page)*

Questions will focus on usability, utility of generic content, and utility of search engine over alternatives

Additional questions will focus on interface suggestions made by users for features that do not yet exist. Questions will involve presenting users with use-case scenarios and paper prototypes to facilitate the discussion.

Sample Scenarios Include:

1. Scenario: You are editing a page that contains an image and a single block of text. You would like to add a second image. Which method would you prefer?
   a. Option 1: There is a button on the page that says "Add Image." Clicking the button allows you to add an image to the end of the page.
   b. Option 2: There are buttons in the text editor that allow to you specify whether to insert an image before or after the text block.
   c. Option 3: Clicking the button allows you to specify where on the page you would like to insert the image by selecting the blocks (text or image) that it should be placed between.
2. Scenario: You are editing a block of text and go to the search feature. While searching for text, you come across an image that you would like to add to your page. Where on the page should the image be inserted?
   a. Option 1: At the end of the page.
   b. Option 2: After the current text block.
   c. Option 3: A window appears asking you to specify where you want to insert the image by selecting the blocks that it should be placed between.
3. Scenario: You want to insert a page into the course.
   a. You go to the course menu and click an "Edit Menu" button.
      i. Option 1: Once on the Edit Menu page, you click an insert page button, which takes you to a page where you specify the type of page, the name of the page, and the section into which you want to insert it.
      ii. Option 2: Once on the Edit Menu page, there are icons next to each section header that allow you to insert a page into that section. Once the button is clicked, a small pop-up appears that asks to choose a page type and give the page a name.
4. Scenario: You want to rename a page in the course.
   a. You go to the course menu and click an "Edit Menu" button.
      i. Option 1: Once on the Edit Menu page, the menu is displayed again, but each page title is an editable text box. You click and type to rename.
      ii. Option 2: Once on the Edit Menu page, there is an icon next to each page name. When you click the icon, a small pop-up appears asking you to rename the page.
5. Scenario: You want to reorder pages in a course.
   a. You go to the course menu and click an "Edit Menu" button.
      i. Option 1: Once on the edit menu page, the menu is displayed and the titles are draggable. You drag and drop to reorder pages.
      ii. Option 2: Once on the Edit Menu page, there are arrow icons next to each page title. Clicking the icons moves the corresponding page up or down one spot.

6. Scenario: You want to change the layout of a page (ex: You want the image to be on the left of the text instead of the right).
   a. Option 1: When editing a page, there is a "Change Page Layout" button that allows you to select from a pre-defined set of layouts based on the type of content on your page.
   b. Option 2: When editing a page, you can click a button to go into "Layout Mode," which allows you to drag and drop the pieces of content to the locations that you want them.
7. Scenario: You change a page and save it, but then decide you want to undo what you did.
   a. Option 1: Open the edit functionality and click a "Reset" button to revert to previous page.
   b. Option 2: Have a flexible "Undo" function in the edit page.
8. Scenario: You've already created a course and want to add a learning objective.
   a. Option 1: Create a new course using old course content as generic content, where appropriate.
   b. Option 2: Add a learning objective to the existing course.
9. Scenario: You want to create a course for a new task
   a. Option 1: Name new task and "attach" existing LOs
   b. Option 2: Select existing LOs and "attach" a new task name
10. Scenario: You want to create course for a new learning objective
    a. Option 1: Name new LO and "attach" an existing task
    b. Option 2: Select existing task and "attach" new LO
    c. Options need to include methods for selecting the interactivity template
11. Scenario: You want to create a course for a new task and new learning objective

Appendix H

Fort Carson Training Completion Protocol

OPTION #1
1. Login to the Army TA using your username and password
2. Select "Route Security: Conduct a Map Reconnaissance" training
3. Review Introduction
4. Review Basic Tutorial – Map Recon
5. Review What Right Looks Like – Map Recon
6. Review Modified Approaches – Map Recon
7. Complete Practical Exercise – Map Recon

OPTION #2
1. Login to the Army TA using your username and password
2. Select "Route Security: Coordinate with Adjacent Units" training
3. Review Introduction
4. Review Basic Tutorial – Coordinate w/Adjacent Units
5. Review What Right Looks Like – Coordinate w/Adjacent Units
6. Review Modified Approaches – Coordinate w/Adjacent Units
7. Complete Practical Exercise – Coordinate w/Adjacent Units

OPTION #3
1. Login to the Army TA using your username and password
2. Select "Building Assault: Indirect Fires" training
3. Review Introduction
4. Review Basic Tutorial – Determine the purpose and effect of indirect fires
5. Review What Right Looks Like – Determine the purpose and effect of indirect fires
6. Review Modified Approaches – Determine the purpose and effect of indirect fires
7. Complete Practical Exercise – Determine the purpose and effect of indirect fires

Appendix I

Fort Carson Training Generation Protocol

Overlay Creation

Now that you have had an opportunity to review the kind of product the Army TA can produce, we are asking you to create an exercise for yourself. To generate this exercise, follow the instructions given below. Note any problems you encounter and raise your hand if you need assistance.

1. Be sure Internet Explorer is set to allow pop-ups.
2. Login to the Army TA using the word written at the top of your observation sheet as both the username and password.
3. Select "Create New Training."
4. Select "Develop Training for a Doctrinal Task."
5. Select "Route Security (or IED Patrol)."
6. Select "Plan a Mission – Conduct a Map Reconnaissance."
7. Click the "Submit" button and save the training.
8. Rename the training to "(Your Last Name) Route Security Training."
9. Select renamed training.
10. Edit the text on the Introduction page by doing the following:
    a. Highlight the first sentence in yellow.
    b. Change one of the headings to your last name.
    c. Add a link to http://www.google.com.
    d. Change the numbered item to a bulleted item.
11. Edit a page in the Basic Tutorial by replacing the image with an image found via the built-in search.
    e. Add a caption to the image.
12. Edit a page in the Basic Tutorial by changing the size of a photo.
13. Edit the Practical Exercise Map Overlay Creation Page as follows:
    f. Search for a map and insert it into the background of the overlay.
    g. Edit the "Base Overlay" that students will see as they begin the practical exercise:
        i. Draw a route in black.
        ii. Add a rally point and label it "1."
        iii. Add a bridge.
        iv. Add a friendly infantry platoon.
        v. Add a hostile signals intelligence squad.
        vi. Add a text box to the map that says "Base Overlay." Make the text green and 30 point.
    h. Lock the base overlay layer so that students will not be able to edit it.
    i. Edit the "Answer Overlay" map:
        i. Copy the base overlay to the answer overlay.
        ii. Add a checkpoint and label it "1."
        iii. Add an observation post.
        iv. Add a friendly psychological operations unit.

          j.   Save the question.
14. Make or suggest content edits as they are noticed.
15. Copy the course you just created.
16. Delete the course you just copied.
17. Try to recover the course you just deleted.

Test Question

Now that you have had an opportunity to review the kind of product the Army TA can produce, we are asking you to create an exercise for yourself. To generate this exercise, follow the instructions given below. Note any problems you encounter and raise your hand if you need assistance.

1. Be sure Internet Explorer is set to allow pop-ups.
2. Login to the Army TA using the word written at the top of your observation sheet as both the username and password.
3. Select "Create New Training."
4. Select "Develop Training for a Doctrinal Task."
5. Select "Building Assault."
6. Select "Plan the Employment of Fire Support – Determine the Purpose and Effect of Indirect Fires."
7. Click the "Submit" button and save the training.
8. Rename the training to "(Your Last Name) Fire Support Training."
9. Select the renamed training.
10. Edit the text on the Introduction page by doing the following:
    a.   Highlight one of the sentences in blue.
    b.   Using the built-in search feature, do a search on the term "building assault." Insert relevant text from one of the pages you find in the search.
    c.   Add a link to http://www.google.com.
11. Edit the What Right Looks Like – Scenario page by replacing the image with an image found via the built-in search.
    a.   Add a caption to the image.
12. Edit a page in the Basic Tutorial by changing the size of a photo.
13. Edit the Practical Exercise by modifying Question 1:
    a.   Change the question to a true/false question.
    b.   Indicate false as the correct answer.
    c.   Add an image to the correct feedback.
    d.   Save the question.
14. Make or suggest content edits as they are noticed.
15. Copy the course you just created.
16. Delete the course you just copied.

17. Try to recover the course you just deleted.

Self-Evaluation

Now that you have had an opportunity to review the kind of product the Army TA can produce, we are asking you to create an exercise for yourself. To generate this exercise, follow the instructions given below. Note any problems you encounter and raise your hand if you need assistance.

1. Be sure Internet Explorer is set to allow pop-ups.
2. Login to the Army TA using the word written at the top of your observation sheet as both the username and password.
3. Select "Create New Training."
4. Select "Develop Training for a Doctrinal Task."
5. Select "Route Security (or IED Patrol)."
6. Select "Plan a Mission – Coordinate with Adjacent Units."
7. Click the "Submit" button and save the training.
8. Rename the training to "(Your Last Name) Route Security Training."
9. Select the renamed training.
10. Edit the text on the Introduction page by doing the following:
    a. Change one of the headings to your last name.
    b. Using the built-in search feature, do a search on the term "route security." Insert relevant text from one of the pages you find in the search.
    c. Add a link to http://www.google.com.
11. Edit a page in the What Right Looks Like section by replacing the image with an image found via the built-in search.
    a. Add a caption to the image.
12. Edit a page in the Basic Tutorial by changing the size of a photo.
13. Edit the Practical Exercise by modifying the Self Evaluation feedback:
    a. Change the bulleted list to a numbered list.
    b. Delete the last item on the list.
    c. Change the text color to green.
    d. Bold the first sentence.
    e. Add an image to the feedback.
    f. Save the question.
14. Make or suggest content edits as they are noticed.
15. Copy the course you just created.
16. Delete the course you just copied.
17. Try to recover the course you just deleted.

Appendix J

User Impressions Survey Results

<u>Usability</u>

Tables 1 – 3 below show the percentage of test participants who endorsed each rating (very easy → very difficult) on the TA usability questions. Table 1 shows the breakdown for all participants. Figures 1-6 show the associated pie charts for each question. Table 2 shows the breakdown for non-commissioned officers (NCOs) only. Table 3 shows the breakdown for commissioned officers (COs) only.

Following these tables, Figures 7-12 graphically depict the NCO/CO ratings breakdown for each usability question.

Table 1 – Usability Ratings, All Test Participants

Question[1]	Very Easy	Easy	Neither	Difficult	Very Difficult
1. How easy was it to take an Army TA training package?[2]	15%	70%	5%	10%	0%
2. How easy was it to construct a training package using the Army TA?	11%	60%	14%	11%	4%
3. How easy was it to edit text?	17%	63%	14%	3%	3%
4. How easy was it to use the search function?[3]	12%	53%	21%	12%	2%
5. How easy was it to insert images?	20%	66%	3%	11%	0%
6. How easy was it to use the drawing tools (if applicable)?[4]	0%	46%	40%	7%	7%

[1]$N = 35$ unless specified otherwise
[2]$N = 20$ for this question
[3]$N = 34$ for this question
[4]$N = 15$ for this question

Table 2 – Usability Ratings, NCOs Only

Question[1]	Very Easy	Easy	Neither	Difficult	Very Difficult
1. How easy was it to take an Army TA training package?[2]	0%	80%	0%	20%	0%
2. How easy was it to construct a training package using the Army TA?	22%	34%	22%	22%	0%
3. How easy was it to edit text?	33%	33%	22%	0%	12%
4. How easy was it to use the search function?	22%	22%	11%	34%	11%
5. How easy was it to insert images?	44%	33%	0%	23%	0%
6. How easy was it to use the drawing tools (if applicable)?[3]	33%	33%	33%	0%	0%

[1]$N = 9$ unless specified otherwise
[2]$N = 5$ for this question
[3]$N = 6$ for this question

Table 3 – Usability Ratings, COs Only

Question[1]	Very Easy	Easy	Neither	Difficult	Very Difficult
1. How easy was it to take an Army TA training package?[2]	20%	66%	7%	7%	0%
2. How easy was it to construct a training package using the Army TA?	8%	69%	12%	8%	3%
3. How easy was it to edit text?	12%	73%	12%	3%	0%
4. How easy was it to use the search function?[3]	8%	64%	24%	4%	0%
5. How easy was it to insert images?	12%	77%	4%	7%	0%
6. How easy was it to use the drawing tools (if applicable)?[4]	0%	33%	33%	12%	22%

[1]$N = 26$ unless specified otherwise
[2]$N = 15$ for this question
[3]$N = 25$ for this question
[4]$N = 9$ for this question

Army TA features that posed a difficulty.

- All of my problems may have been related to the speed of the computer, but the program did not seem to respond to my input.
- Provide an edit option to the line (i.e., Add points, delete points, move points) 2) Fix the unit/symbol feature. Automatically inserts last item and current item.
- The drawing tool was very slow and not very easy to use. Also, it could use more graphical control measures from FM 101-5-1 (FM 1-02)
- Drawing tool has a slight delay. It should be more free-flowing instead of straight angled.
- Overlay products were difficult to manipulate (location, size) not intuitive to create overlays. Maps were difficult to read/use Zoom function would've been great.

- Map overlays had some difficulty loading. Searches at times froze. Selecting certain icons on map/moving/rotating same icons
- The issues were the inserting? Tactical units with the right symbols/text on the map overlay.
- Using all of the tools in the map function while trying to do an overlay
- First time users of the map functions and editions could find is difficult, however once it's understood it is very simple.
- No 'undo' feature. Search engine was sluggish.
- The buttons in the tutorial and the edit pages are not easily identifiable the edit text box is slow and cumbersome.
- Hard to modify outline and basic structure freezes up during editing. Very rigid training module
- Editing text and saving it
- Changing the questions
- It was kinds hard to find some buttons maybe if there was a central location
- The search would be better as a simple Google image search. I didn't find the pictures I wanted.
- The edit function seemed a bit awkward at times considering there is the edit button then the edit icon a little confusing.
- Icons not showing their functionality.
- If you select the pan Tool you lose your tool bar. Maybe make an option on the tool bar to pan w/o losing the tool bar.
- Edit text on map overlays - we are used to PowerPoint interface if all map overlay tools were modeled based on that it would be easier.
- No copy-paste function. Need line point editing function. Need doctrinally correct OPORD (Higher) to drive planning. Need size of icons to be adjustable.
- Would be easier on users to add a 'Microsoft feel' to the program. Users would be used to dealing with the Microsoft-like programs and so it would be easier to navigate from area to area.
- Some of the edit location [finding the edit button/icon]

Utility
1. How useful do you think the Army TA will be for conducting unit training? ($N = 36$)

Definitely =	22% ($N = 8$)
Probably =	25% ($N = 9$)
Maybe =	28% ($N = 10$)
Probably Not =	22% ($N = 8$)
Definitely Not =	3% ($N = 1$)

Please list the reasons why/why not.

- It cannot replace training conducted with live human beings.
- It has to include current TTP (which are classified)
- This may be good to train Platoon Leaders on developing OPORD & graphics, however I do not see the utility in training an infantry Company with a computer based tool.
- Some Soldiers will tend to skim thru the training. With the overload of online assessments and courses, the Soldiers will probably prefer more hands-on training.
- Must be easier to use than PowerPoint which is what most units are using to (??) classes, etc.
- All base information would be standard Army-wide. Units could see training developed by other units with more/different experience.
- Biggest concern is not enough computers with Internet access to train on at the unit. Next most Soldier tasks require hands-on repetition for proficiency which does not come from computer training.
- Computer constraints for Soldiers (access). Time consuming.
- The more courses and info that is available will be great. The reason it will have trouble is that there are not enough computers at lower levels for every Soldier to do this training.
- Easy to use easy to access.
- The dynamics of [unreadable]. Missions have multiple answers and are often subjective. The answers given by the testee may be correct? But may no coincide with the final assessment.
- I won't train subordinates with one method and evaluate them with another.
- Limited use, lack of computers, lack of practicality. Might be helpful in AIT/OBC
- The only draw will be availability of computers. Other than that a very good tool.
- If it worked better it could be useful
- It gives leaders a base to start training
- Lack of computers/Soldiers view online training as something they must rush through/most units try to do hands-on training on small group discussion, never computers.
- Although there is a computer shortage in most units that will inhibit mass amounts of Soldiers processing though training
- It is useful it creates redundancy? A Soldier can train on the computer, then go and do it the field.
- Maps preloaded, less materials needed.
- Using the computer requires less resources (maps, pencils, etc.)
- There are a lot of software tools to assist in planning training and or missions for units. It's really dependent on the commander on what tool they prefer.
- Menus are intuitive and easy to understand. Content will make or break this training tool.
- I (battalion level) do not have time to create/alter courses. If there was a database on deployment specific tasks already available - focused on platoon/company level, that would be useful.
- Good for leader training & small unit training
- As long as the technology is available and easy to use, units will be able to put it to use.
- This system would be better suited to train leaders at PLDC, BNOC, and WLC to understand theories behind the practical. At unit level there are too many constraints time, equipment, # of personnel to train, individual computer understanding.

- Very easy to access information, all at your fingertips. Did not have to go into a different program IE, search engine, file, program.
- The TA system will be good to reference training and training units. The TA system will not be good if it is the method of training.
- Who will load images? Where will they come from?
- It will depend on Commander.
- Have a block of instruction at PLDC & BNCOC to show new small unit leaders what it is capable of.
- Due to time constraints and or resources this TA can be very helpful.

2. *Could* you use the Army TA to create the kind of training your unit needs? ($N = 36$)

No =   25% ($N = 9$)
Yes = 75% ($N = 27$)

Please specify why/why not.

- The training that I cannot depends on having real Soldiers will real equipment, functioning in concert w/each other.
- I would use it to help develop platoon leaders, squad leaders, and Section SGTs
- Again, this would only be useful to train leaders on planning an operation.
- It might help for leaders to plan their training and create handouts for Soldiers as a reference. As far as using this as a primary trainer, no way.
- Provided it develops a robust database of courses, it could be a useful tool.
- It could be used mainly as a leadership tool. Average Soldiers would not require this type of training.
- Again my unit is an artillery unit that most tasks require hands-on repetition to complete to become proficient at.
- Leaders could use it to create a class
- Our unit will be conducting a non standard mission, being able to find other branches courses would be very valuable.
- It has most functions needed to do anything I need. It would have been nice to be able to see how well the search function worked.
- It does provide some assistance for training in basic doctrine.
- It could be useful but needs to be more embedded w/doctrine and FMs
- Is geared toward leader training lack of computers/Internet in co area, structure is too rigid to easily modify, involves rote memorization, not multiple scenarios
- You have the availability of creating any class type you need.
- I wasn't able to edit it and save changes
- Give me a start on the work/plus changing it to my needs was not hard.
- I think that face to face hand on combat training is best. I see little use for computer based training for my MOS that is.
- Collective/individual task, Senior NCO friendly.

- My unit does not have the computer resources and my Soldiers would not be receptive. I think they need trainers and instructions available to pass on wisdom and answer questions.
- Easy to charge based on training requirements
- I could use this to conduct battery level training on something like drivers or range safety certification.
- Once the programs are in the computer Soldiers of today play games with computers and they are so similar with their function it will make it interesting than from your traditional black board.
- Map reading is always useful.
- Most of the training my Soldiers need is hands-on and is best learned with the equipment in hand.
- This is a good training application for higher level HQ to create scenarios for subordinate units. Time intensive for Battalion and below.
- But based on current ARFORGEN/deployment timeline I (my unit) does not have the time/manpower to create training - could tailor already existing training.
- Not applicable at Corps level, we use Command Post of the Future & large scale simulations.
- It would help in making scenarios based training to make Soldiers use their heads and think on their feet as opposed to cut and dry doctrine.
- Excellent way of transferring SOPs but there are constraints at unit level.
- It is customized to my needs. PowerPoint, Word, Excel, all rolled into one.
- The TA will create a good source for our unit to rotate training both hands-on and online.
- It can be tailored to unit need.
- This can be used for refresher training or for extra training.

3. *Would* you use the Army TA to create unit training? ($N = 35$)

    No =   34% ($N = 12$)
    Yes = 66% ($N = 23$)

Challenges to using the Army TA for conducting unit training:

- Must have real one-on-one Soldier interaction.
- Classified material/accessibility.
- Lack of computers to train individuals. 2) Not geared towards individual tasks.
- Getting seasoned senior NCOs who have developed their own TTP and SOP to adopt it.
- Access to database from theater (opportunity & speed) Resident knowledge to solve problems.
- Computer access/network reliability. Not pertinent training for all Soldiers
- Biggest issue will be having enough computers with LAN access at the unit level for training.
- I think it would be easier to train in a field environment.
- Not enough access to computers so that every Soldier can do the practical exercise portion.

- Time and Internet constrains in while deployed. It's quick but [unreadable] Internet could make it more difficult.
- Prefer using group discussions (AAR) as opposed this 'Stove Pipe' method.
- No computers. Best training method is a good NCO.
- See previous answer. Most training is either hands-on or based on multiple scenarios.
- Too many Soldiers and not enough computers.
- Can't be taken to the field/Changing it to Battalion guidelines.
- Needs more info i.e., References, FMs, Books, points of contact.
- Resources. No 'teacher' available to Soldiers.
- Possibly accessing it.
- Will keep Soldiers more focus on the learning objective than trying to teach on black board.
- Getting laptops for the platoon would be the hardest part.
- Learning curve for the Soldiers using the software.
- Time to create relative scenarios.
- time/manpower.
- See observer notes. Not Blue Force Tracker, Command Post of the Future, FBCB2.
- Availability, user friendly.
- Some area of training require more hands-on than actual reading.
- Very user friendly; no challenges if you know what you are trying to accomplish.
- Will need to have enough computers and [no(?)] time constraints.
- It will take time to learn interface make it more like Microsoft office products and people will learn it faster.
- Time-consuming for the instructor to set training up, however, once established, the training would be very useful.

Feasible alternatives to using the Army TA for conducting unit training:

- The old fashioned hands on training we all know and love.
- Non-Commissioned Officer Professional Development and Officer Professional Development.
- Situational Field Training Exercises 2) Line fire exercises.
- More hands-on field training.
- Nothing beats hands-on, feet-to-the-fire training. Close Combat Tactical Trainer provides similar training - use Army TA in conjunction with Close Combat Tactical Trainer and other simulations.
- Classroom training with a projector, field training, hands on individual training.
- Having pictures or videos of what the right way to do training is, so instead of going step by step over slides, classes are also on a video link explaining the text.
- PowerPoint.
- Would like to see a system that would consolidate several users into group discussions.
- Using Blue Force Tracker/FBCB2.
- Video games. Field training. Manuals/doctrine.
- Small group briefings.

- Putting the classes on paper and training a unit call at once.
- AMs/Books/Training Manuals.
- Squad leader, team leader.
- FM and field training. Field manual.
- Hands-on training/chalk board training/computer based Advanced Field Artillery Tactical Data System (classified). This is great for the visual learner.
- Hard copy tests/training.
- Old fashioned paper maps.
- PowerPoint briefing, small unit groups.
- Existing Army systems combined with written scenarios can achieve the same desired result.
- Products that currently exist - PowerPoint briefings/online courses offered on Army Knowledge Online.
- Leader training & small unit training.
- Unit's already using hands-on training that is provided. This may be a good alternative.
- Training rotation with other units to do both hands-on and reference the training online.
- Skill port/Skill soft

Effectiveness
How effective do you think the training generated by the Army TA can be for addressing key training requirements in your unit? ($N = 35$)

Very Effective =	17% ($N = 6$)
Somewhat Effective =	66% ($N = 23$)
Neither =	11% ($N = 4$)
Somewhat Ineffective =	3% ($N = 1$)
Very Ineffective =	3% ($N = 1$)

Training requirements you think the Army TA training could address effectively.

- Mission Planning.
- Mission planning 2) Operational Planning.
- Drawing overlays.
- Any tactical scenario (cordon & search ambush, room clearing).
- Leadership development from squad leader up. Decision-making skills.
- Unit movement, Hazmat, Ammo handlers course, shell & fuse combination for field artillery units.
- Convoy. Route Clearance. Room clearing.
- Tactical training & other training such as safety courses, emergency operations, etc.
- It would enable people to make any kind of training. Anytime. Even those without systems like PowerPoint.
- Information operations. ROE.
- A practical exercise in a classroom will not address the necessary training requirement of face to face training & evaluation.
- Basic doctrine.

- Cordon and search, patrol base ops, casualty evacuation procedures (Urban and Mountain terrain).
- ROE.
- Knowing the basics/giving new Soldiers a guide line.
- Training units that don't always do the stuff addressed in the TA trainer.
- This program is good for big Army though brigade to create lessons and practical exercises for safety modules or any training they want all Soldiers to take.
- Range safety certification safety training. Drives training. Privately-owned vehicle risk assessment.
- Map reading, recon, and symbols. Route recon.
- Basic Soldier tasks that are uniform throughout the Army such as map reading.
- Pre-deployment specific tasks.
- Leader training & small unit training.
- This can be better for long term-older branches such as Infantry/Field artillery. I am Air Defense and we have our own Army training technology to train on for those tactics. This would be good for basic Army infantry skills (leadership).
- Leader training.
- The system could add more training on combat operation as well as MOS training.
- On the spot training that is fast and readily available.
- ROE would be a great way to start.

General
1. What did you particularly *like* about the Army TA?

- Address a large audience.
- Provides a digital tool to train Platoon Leaders on planning operations.
- Lessons and references.
- Potential database of courses. Course formatting… fill in the blank+good.
- Ease (general) of use. Covering all bases with the general knowledge
- The TA was easy to use, modify, and was overall user friendly.
- Ease to use.
- Very easy to learn.
- Quick and easy also I ran make a text only class that would be easier for the slow Internet during deployment.
- User friendly.
- Good idea.
- Very simple.
- Versatility.
- The layouts.
- Being able to change the course.
- It does give you an idea of what needs to do.
- It was flexible and you don't need to start from scratch with your training.
- Great userability/very simple
- User-friendly.

- Very small and handy and easy to maneuver and set up.
- Easy to use.
- It could allow Soldiers to take the training at their own pace.
- Ease of use.
- Ability to tailor courses, ability for individual users to access/use several different courses.
- Can create entire programs of instruction/classes tailored for leader development; good for remote training.
- It is/can be interactive. A Soldier can do this at home, on his own.
- Ease of use and ability to change to unit SOPs.
- All tools/materials needed are at my fingertips.
- Easy access user friendly.
- Easy to navigate.
- It's simple use.
- Fairly easy to use.
- Uses very similar buttons to common software.
- Simple to use. Straightforward.

2. What did you particularly *dislike* about the Army TA?

- Was not user-friendly for me.
- Too vague.
- Not focused on training a unit 2) Difficult to use drawing interface
- Feels too much like Blue Force Tracker, but is easier to use.
- Overlay tools.
- Difficulty in drawing/creating map overlays.
- I don't like computer based training because it removes the Soldier from the outside training environment with hands-on training.
- Time consuming.
- Not easy to search for help when trying to figure out how to do stuff.
- Cannot look out the 'Next button' under certain conditions.
- Difficult to read and follow a map when both are not visible simultaneously
- Not doctrinally correct. Too civilian/simplified. Not intuitive.
- Not really interactive. Content sucks.
- Not practical.
- Can't be e-mailed or saved to other people.
- Skips over a lot of stuff. Needs more content.
- I believe it is not practical for company and below training.
- The search option could be made simpler
- I didn't really dislike anything
- Not being able to use it at the unit level - not enough laptops.
- Not sure how useful it would be in branch/MOS specific missions might be good for familiarizing Soldiers w/ equipment but not the functionality.
- Relies heavily on scenarios that take time to build.

- Amount of time it takes to develop/create training.
- Needs to be linked to doctrinal references & more like PowerPoint commands.
- Not as friendly to the user. Takes someone to push buttons to teach themselves how to navigate through the pages.
- Not understanding Soldier constraints at small unit level.
- Some location of edit button location [finding the edit button/icon]
- Search wasn't as intuitive as it could be.

3. What recommendations do you have for improving the Army TA?

- Stop development. We're trying to reinvent the wheel here. The Army has training programs in place that work. It ain't broke - don't try to fix it!
- Base scenarios on doctrine and add TTP (local area and theater) for trainer options
- Improve drawing capabilities and editing tools, no one will use this if it is difficult to develop scenarios for training.
- Have an option in the beginning to select your type of unit (i.e. Fire Support Cell mortar platoon, sniper team, etc.) include METL for each type of unit.
- Develop, manage and provide oversight on course database. Biggest competitor is Microsoft PowerPoint, must be same interface or easier.
- Make it easier for the instructor to edit quickly. Ensure courses/training is not limited by site or unit - all classes across the Army should be accessible to everyone. Find a way to coordinate use of TA (specifically route recons, etc.) in conjunction with Close Combat Tactical Trainer and Engagement Skills Trainer 2000 and other Army technology
- It is a good tool but should be used for limited personnel.
- Fix small glitches annotated? On note page. [unreadable] The amount of text.
- Integrate tasks, conditions and standards from each MOS & Branches Mission Essential task list (METL) so it makes it easier for leaders to find the correct training. Also integrate CALL Lessons learned to stay current with new trends.
- Ability to lockout the 'Next' button until certain conditions are met on the page.
- Make it more interactive (i.e., Encyclopedia programs). Animations to go with the material, or maybe videos showing actual events (the do's and don'ts)
- Soldiers need consistent training that matches what they see in combat.
- More interactive. More real world.
- Not an issue now but once classes start flooding in on a master page, have them categorized by combat missions, logistic, personnel, and so on.
- Make it more directly correlate to how we do things not what we do
- Printing option/dictionary.
- Have a mix of both book and personal ideas.
- I do not think this project should be pursued.
- Have a way to start from scratch. Be able to print certificates.
- Have cursor be able to identify and explain what each icon does.
- Consider renaming layers. Different icon for the 'fill' option. More 'save' buttons available.
- Making the images more interactive for example create an image map of radio, select the buttons as hot spots that would be 'configurable' to allow the user to input different

frequencies, channels, also display pop up information that would benefit the user. Interactive modules for treating a casualty, secure prisoners of war.

- Manipulating images/icons should mirror PowerPoint. Create a database of scenarios/programs of instruction or be able to pull from existing Army databases.
- User friendly (Microsoft-like).
- Proposed audience - school house, unit leadership (battalion & higher), train new leaders on SOPs BN level.
- Continue to do survey to work on some of the defaults in the program software.
- Come up with tutorials for the basic Army make up; i.e., combat arms, combat support, combat service support, aviation.
- Continue the 'user friendly' testing.
- I think once a user becomes familiar w/the system it will become easier to use.